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OFFICIAL HANDBOOK

OF THE

CEYLON COURT.

With Maps and Illustrations.

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Note descriptive of the Illustrations on the Cover.

By GERARD A. JOSEPH, *Librarian, Colombo Museum, and Joint Honorary Secretary, Ceylon Branch, Royal Asiatic Society.*

THE front page represents the style of doorway to be found in the ancient Buddhist temples of Ceylon. The monster on the top, together with the figures supporting it, is called a *makara torana: makara* meaning 'monster,' and *torana* 'arched gateway' or 'portal.' It is said to represent the flag raised by Deva Pajjunna on the day that Gautama attained Buddhahood. The flag is called *makaradhvajaya.* The *makara* is supposed to be a fabulous amphibious monster, usually taken to be the shark or crocodile. but depicted in the signs of the zodiac with the head and forelegs of an antelope and the body and tail of a fish.

The figures on the two sides of the *makara* represent the assembly of gods (Indra, Brahma, Vishnu, &c.) gathered together to pay their respects to Gautama when he was born. The *garunda* and the white elephant are shown as "the vehicles of the gods." In some temples there will be found figures of more gods alongside the *makara torana:* this depends on the amount of space available for the purpose.

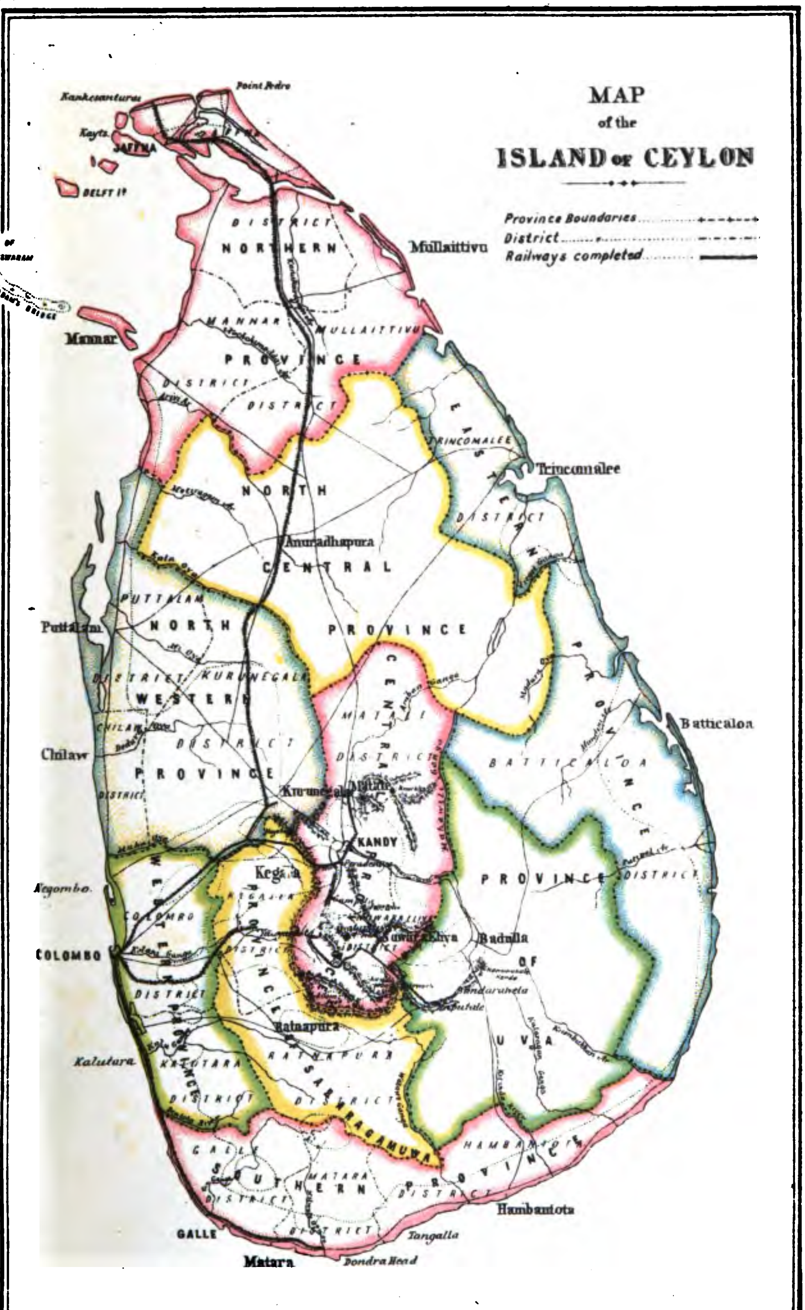
The two figures at the base are *doratupálas* (gate-keepers).

The rest of the pictorial representation is merely ornamental, depicting the typical style found in temples.

The illustration inside the front of the cover shows the stately Talipot, or great fan-palm, *Corypha umbraculifera*, in blossom, This tree always presents a grand and imposing appearance, and has been called the "queen of palms." It grows to a height of about 100 feet and accumulates strength for nearly half a century, then in a gigantic final effort blossoms, and thereafter dies. The mass of flower forms one majestic pyramid of snowy plumes of sweet scent. The spike which supports the blossoms rises from the middle of the leafy crown of the plant, sometimes to a height of about 20 feet, forming a glorious object, and is generally visible to travellers along the Colombo and Kandy Railway. The Talipot palm of Ceylon is notable for the variety of uses to which its leaves are put. The leaves being of immense size and palmate (with the blade attached near the middle), they are easily formed into fans and umbrellas; they are also utilized for thatching purposes. As regards their use for ancient books, see *Tennent*, quoted at page 172.

The illustration inside the back of the cover is of a model (exhibited in the Colombo Museum) of the Dalada, or Sacred Tooth of Buddha, enshrined in the Dalada Maligawa at Kandy; it will be found referred to on page 33.

The faces at the top of the doorway which serves as a framework to a view of the sea coast showing the palm-fringed shore, on the back of the cover, represent the sun and moon (*ira-handa*), and are probably intended to indicate that the temple, or the gift of it, was to remain "as long as the sun and moon shall last."



Scale of 38 Miles to an inch

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Governor of Ceylon from 1896 to 1903.

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CLASSIFICATION OF EXHIBITS.

(According to the Official Catalogue.)

DEPARTMENT A.—EDUCATION.

Classes 1 to 26.

Groups 1 to 8.—Reports and other publications dealing with General, Technical, and Professional Education. Text books and curriculums, Museum publications, Library catalogues, papers referring to scientific investigations, &c.

DEPARTMENT B.—ART.

Classes 27 to 45.

Group 9.—Paintings and drawings of native types; scenes, drawings from restorations, frescoes; specimens of native painting, &c.

Group 10.—Engravings of archæological designs, inscriptions, &c.

Group 11.—Sculpture, models of native types in plaster, wood, or ivory.

Group 12.—Architecture, drawings, models, and photographs of Kandyan architectural work.

Group 13.—Loan collection. Selections of specially interesting art works of various kinds from institutions and private collections (Museum, Kandyan chiefs, &c.).

Group 14.—Original objects of art workmanship. Art work in earthenware and pottery, metal and wood, textiles, and artistic binding.

DEPARTMENT C.—LIBERAL ARTS.

Classes 46 to 161.

Group 15.—Typography: various printing processes. Specimens of Typography, Printing, &c. Reproductions of engravings and drawings.

Group 16.—Photography.
Artistic photography as applied to portraiture, landscape, &c.

Group 17.—Books and publications, Bookbinding. Newspapers and other periodicals, books (new publications, Buddhist books, &c.). Specimens of Binding, &c.

Group 18.—Maps, charts, &c.

Group 19.—Instruments of precision, &c.
Coins, weights and measures, and statistics relating thereto.

Group 21.—Musical instruments.
Native instruments of music.

Group 22.—Theatrical appliances and equipment, costumes, masks, puppets, &c., used in nautch and devil dancing, &c.

Group 23.—Chemical and pharmaceutical arts.
Tanning materials, essential oils, glues, extracts (rose water, &c.), disinfectants, glazes, ink, rubber, blacking, dye stuffs, pigments, varnishes, drugs (native).

Group 26.—Models, plans, and designs for public works.

DEPARTMENT D.—MANUFACTURES.

Classes 162 to 392.

Group 30.—**Goldsmiths' and Silversmiths' work.**

For religious or common uses in gold, silver, bronze, or other metals (Kandyan brass and silver work, Negombo brass work, &c.).

Group 31.—**Jewellery.**

Kandyan, Low-country, and Jaffna work; lapidary work: gem cutting, &c.

Group 33.—**Productions in marble, bronze, &c.**

Art work and reproductions of art in metals, repoussé, and stamped metals.

Group 34.—Fancy articles, &c.

Basket work (Kalutara, Jaffna, Matara), work boxes and small fancy furniture (wood inlaid with ivory, tortoise-shell, porcupine quill, &c.); fancy articles in tortoise-shell and ivory, lacquer work, small bronzes, rush work; Kandyan and Maldive mats, &c.

Group 36.—Toys.

Lacquer toys, native dolls, games, &c.

Group 37.—Decoration and fixed furniture.

Ornamental carvings, drawings of decorations, decorative painting (mainly Kandyan).

Group 38.—Office and household furniture.

Group 45.—Ceramics.

Earthenware, bricks, tiles, &c.

Group 55.—Threads and fabrics, &c., cordage.

Vegetable fibres (prepared), rope, native cloths and handkerchiefs (Batticaloa, Chilaw), coir matting, and rugs

Group 58.—Lace, embroidery, &c.

Pillow lace (Cotta and Galle), Ceylon embroidery.

Group 60.—Leather, &c.

Prepared skins and hides, shoes, boots, &c.

Group 61.—Various industries connected with clothing.

Hats and caps, native costumes, whips (Kandyan), fans (Jaffna).

DEPARTMENT E.—MACHINERY.

Classes 393 to 427.

Group 64—General machinery.

Models of tea machinery, &c.

DEPARTMENT F.—ELECTRICITY.

Classes 428 to 451.

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DEPARTMENT G.—TRANSPORTATION EXHIBITS.

Classes 452 to 484.

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Group 74.—Railways.

Statistics, maps, and publications (railway time tables) relative to railways.

Group 75.—Mercantile Marine.
Drawings, models, and specimens of native crafts; statistics and charts relative to Navigation and Commerce.

DEPARTMENT H.—AGRICULTURE.

Classes 485 to 621.

Groups 78 and 79.—Farm equipment—implements of husbandry.

Group 81.—**Tobacco** (Northern, Eastern, and North-Western Provinces).

Group 82.—Appliances and methods. Tea factory, oil mill, &c.

Group 83.—Agricultural statistics relative to crops, stock, &c. Books, papers, diagrams (Planters' Association Reports, planting maps, &c.).

Group 84.—Vegetable food products.
Paddy and **rice**, dry grains, &c.
Tea, coffee, cacao, &c.
Oil-producing seed products, **cocoanuts**, &c.
Cocoanut poonac, gingelly poonac.

Group 85.—Animal food products.
Dry fish, fish roe, bêche-de-mer.

Group 86.—Equipments and appliances employed in the preparation of foods.
Tea factory and machinery, **oil** mills, **arrack** stills, &c.

Group 87.—Farinaceous products and derivatives.
Arrowroot, cassava, plantain flour, kitul flour, kurakkan flour, &c.

Group 90.—Sugar confectionery—condiments and relishes.
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Group 93.—Distilled spirits—**arrack,** rum.

Group 95.—Inedible agricultural products.
Vegetable fibres (cocoanut, kitul, palmyra fibre).
Inedible fats and oils (**citronella,** &c.).
Plants containing tannin (wattle, &c.).
Plants containing dyes (annatto, &c.).
Drug plants (**cinchona,** &c.).

Group 96.—Insects and their products, plant diseases.
Ceylon agricultural insect pests.
Honey, wax, lac.

DEPARTMENT J.—HORTICULTURE.

Classes 622 to 652.

Groups 108 and 109.—Trees, shrubs, &c.
Tropical plants of Ceylon and ornamental plants.

Group 110.—Seeds and plants—collection.

Department K.—Forestry.

Classes 653 to 666.

Group 112.—**Forest topography, maps, statistics, &c.**
Forest products.

Group 113.—**Forest products, sections of wood, dye woods (chaya).**
Cabinet and builders' woods.
Tan (kadol), fragrant and resinous substances, basket, grass, and bamboo work.

Group 114.—**Plants, roots, bark, &c. (uncultivated), used for medicine, native wild drugs, gums (caju, &c.), oils (kekuna, &c.), rubber (Para, &c.).**

Department L.—Mines and Metallurgy.

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Group 117.—Mine models, maps, photographs.
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Group 119.—Literature on Mining and Metallurgy.
Statistics and publications relative thereto.

Department M.—Fish and Game.

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Group 121.—Products of **Hunting**.
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Stuffed animals, birds, and reptiles.

Group 122.—Fishing equipments and products.
Nets, fishing boats, model of **Pearl Fishery**, &c.

Group 123.—Products of fisheries—cured fish, roes, dugong oil, bêche-de-mer, pearls, pearl shells, coral, **tortoise-shell.**
Collections of shells, chanks.

Group 124.—Fish culture.
Statistics of the results of fish culture, reports, &c.

Department N.—Anthropology.

Classes 739 to 743.

Group 125.—Literature.
Books, pamphlets, photographs, &c., referring to the early inhabitants of the Island.

Groups 126 and 127.—Models of racial types, photographs illustrating Vedda life.
Archæological specimens, Buddhist relics, masks, Buddhist books, lacquer paintings, &c.

Department O.—Social Economy.

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Aitken, Spence & Co.—
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Alma Estate, Maturata (G. H. Bennett)—
Black Tea, 517.

Alnwick Estate, Uda Pussellawa (E. V. Young)—
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Babeihamy, W. A.—
Tortoise-shell Work, 199.

Bagot, H. W. (Arapolakanda, Tebuwana)—
Green Tea, 517 ; Cloves, 561 ; Para Rubber, 666.

Baker & Hall—
Plumbago, 691.

Balangoda Planters' Association—
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Bois, F. W.—
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Green Tea, 517.

Burke, R. (Waitalawa Estate)—
Tea, 517.

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PREFACE.

CEYLON was the first country in Asia to express a desire to participate in the International Centennial Commemoration of the Louisiana Territory Purchase. Besides its own Pavilion near the northern end of the Agricultural Building, the Island's products occupy space in the following sections: Education; Art; Liberal Arts; Manufactures; Agriculture; Forestry; Mines and Metallurgy; and Fish and Game.

In the matter of the standard samples in the Commercial Sales Room in the Ceylon Court duplicates have been placed in the Chamber of Commerce Building, Colombo, ensuring thereby accurate and prompt execution of wholesale orders by business firms in Ceylon. Most of the curiosities and other articles exhibited in the Ceylon Court will be for sale at the close; and inquiries should be made meanwhile of the Ceylon Commission.

This Handbook is intended to arouse more than a passing interest in the products and attractions of Ceylon. It is similar in size to those prepared for Chicago in 1893 and Paris in 1900, but is obtainable at a much lower price; and of 10,000 copies, 7,000 are for distribution in St. Louis.

Americans are now directly interested in paternal administration in the Orient; and though Ceylon could hardly be further away from both seaboards of the North American continent, it is on the main line of tropical travel and traffic. It is yearly becoming better known, and the journey hither is being constantly improved in comfort and time.

It may be possible to place on permanent record in part of this edition the opening scene at the Ceylon Tea House and a group picture of the Staff.

Colombo, February 1, 1904.

"When Ceylon sweeps thee with her perfumed breeze
Through the warm billows of the Eastern seas."

OLIVER WENDELL HOLMES.

"This Ceylon is a brave Island, very fruitful and fair."

HAKLUYT.

UNIVERSITY OF CALIFORNIA

SIR HENRY WARD'S STATUE, ETC., KANDY.

CHAPTER I.

CEYLON AND ITS ADMINISTRATION.

BY

H. WHITE, Ceylon Civil Service.

Historical Introduction.

CEYLON, the "Eden of the Eastern wave," and the premier Crown Colony of the British Empire, is an Island in the Indian Ocean lying between 5° 54′ and 9° 51′ N. lat. and 79° 42′ and 81° 55′ E. long. In comparative size it is about equal to Belgium and Holland, about three-fourths the size of Ireland, one-eighth the size of France, or three-eighths the size of the State of Missouri. Its extreme length from north to south is 270 miles, and greatest width 137 miles. Its total area is 25,481 square miles, and population 3,629,986.

The Maldive Archipelago of numerous atolls or coral islets under the Sultan of the Maldives, and with a population of some 30,000, is distant about 400 miles west of Ceylon, of which it is a dependency.

The name "Ceylon," formerly spelt "Seilan" or "Sailan," represents the native word "Sinhala" (pronounced Sing-hala), of which the historical origin is uncertain, though "Sinha" means "lion." A shorter and more strictly local form of the same word is "Elu;" and with the addition of *dipa*, "island," it forms "Selhan-dib," or "Serendib," the Arabic form of the name of Ceylon in the middle ages.

In the classical language of India, and in ordinary native use in Ceylon itself, the Island is called "Lanka."

A third name, perhaps the oldest geographical name of the Island, was Tamraparni, whence Milton's "utmost isle Taprobane."

Ceylon has been continuously, but not entirely, ruled by European races since 1507, when the Portuguese first settled on the west and south coasts. The Dutch dispossessed the Portuguese in 1656, but gave way in turn to the English, who have held the Maritime Provinces since 1796, and the whole Island, including the interior and mountainous Kandyan kingdom, which neither the Portuguese nor the Dutch ever occupied, since 1815.

The dominion of Holland in Ceylon nearly equalled in duration that of Portugal, each having ruled the maritime belt for about one hundred and forty years; but the policies of the two countries have left a very different impress on the character and institutions of the people amongst whom they lived. The most important bequest left by the utilitarian genius of Holland is the Code of Roman-Dutch Law, which is still practically the common law of the low-country; whilst the propagandism of the Portuguese has reared for itself a monument in the abiding and expanding influence of the Roman Catholic faith, which flourishes in every hamlet and Province where it was implanted by the Franciscans. The language of the Dutch, curiously enough, has ceased to be spoken even by their direct descendants, but a Portuguese patois is to the present day the vernacular of the lower classes in the chief towns.

India.—Ceylon, though so near the continent of India from which it seems to hang like a pendent jewel, is politically quite distinct from its neighbour. For a very short period indeed in the early history of the British occupation of Ceylon the government was administered from Madras, but with disastrous consequences. The fiscal changes that were made, and the Malabar agents imported to enforce them, caused open rebellion, which led the British Government to administer the Island direct from the Crown, which sent out the first British Governor in 1798.

The Sinhalese language, the national language of 2½ millions of the inhabitants of Ceylon, is unknown in India; the geological formation of Ceylon is different; and about 30 per cent. of its flora is endemic, a proportion usually found only in oceanic isles far away from continents.

An area of about 4,000 square miles of the interior of Ceylon towards the south is covered by a circular mountain plateau, while the northern and north-central parts form a

great plain from sea to sea. To the south-east and north the hills break off abruptly, but on the west and south-west the country between the mountains and the sea is hilly and undulating. Across the central plateau, from north to south, runs a dividing range of mountains, whose highest peak, Pidurutalagala, reaches an altitude of 8,296 feet. Rising to a lesser height, 7,353 feet, is the world-famed Adam's Peak, on the summit of which is the footprint revered alike by Buddhists, who claim it as impressed by the founder of their religion, and whose monks are its custodians, and by Mohammedans, who claim it as the footprint of the father of the human race whose name attaches to this sacred eminence.

The climate is, on the whole, healthy for a purely tropical country. The mean annual temperature at Colombo is about 81° F.; at Kandy, at an elevation of 1,600 feet, it is about 76° F.; and at Nuwara Eliya, the sanitarium of the Island, at 6,188 feet, it is 58° F., the thermometer falling at night in the cold season to freezing point. The birth-rate per 1,000 is 39·1, and the death-rate per 1,000, 27·5 for the whole Island.

The mean annual rainfall varies from 30 or 40 inches in the north-west and south-east to 200 inches in the interior, being controlled to a great degree by the dividing range of mountains alluded to above. There are, roughly speaking, two seasons, the *south-west monsoon* and the *north-east monsoon*. During the former the rainfall is mainly confined to the south-west part of the Island, while the north-east rains are more equally distributed.

None of the rivers of Ceylon are navigable by ships, and only a few by boats, and these for but a short distance. The largest river, the Mahaweli-ganga, rises in the heart of the mountains, and after a course of 190 miles finds its way to the sea near Trincomalee. The next longest streams are the Kelani-ganga, which enters the sea at Colombo, and the Kalu-ganga and Gindura rivers, the mouths of which are at Kalutara and Galle respectively.

Harbours.—There are only three real harbours on the coast. The Trincomalee harbour, which is unfortunately situated on the less accessible eastern side of the Island, is a magnificent land-locked harbour which the East India Squadron makes its headquarters. The harbour at Galle, for so many years the well-known port of call for all vessels plying from England to India, Australia, and the Far East under the name of "Point-de-Galle," is dangerous, and has for some years past yielded the pride of place to Colombo, which possesses an excellent, safe, and capacious artificial harbour.

Vegetation.—The soil of Ceylon is not rich, but the vegetation is most luxuriant, especially in the moist zone. The chief vegetable products are cocoanuts, rice, tea, cinnamon, cacao, cardamoms, tobacco, and rubber, and among valuable timbers ebony, satinwood, and calamander.

TEA PLUCKER (TAMIL GIRL).

Mineral Products.—Among precious stones the sapphire, ruby, cat's-eye, aquamarine, chrysoberyl, cinnamon stone, topaz, garnet, and moonstone are plentiful in Ceylon, while the pearl fishery of the Gulf of Mannar yields at irregular intervals a large income to Government.

Salt yielded by the evaporation of sea water in the Southern, North-Western, Northern, and Eastern Provinces is a valuable Government monopoly. Plumbago, or graphite, which is used for making crucibles and lead pencils, is an article of considerable export, especially to the United States.

Animals.—Ceylon is famous for its elephants, of which a considerable number remain in the wild state and under careful protection. The other large wild animals which inhabit the jungles of the Island are the bear, the leopard, four species of deer, the buffalo, and the wild boar.

Language and Religions.

The great bulk of the population is, as will be seen, Sinhalese, a people peculiar to Ceylon. The large majority of them are Buddhists; the rest are Christians, mostly Roman Catholics.

According to tradition, both Indian and local, the Sinhalese are of Aryan race and connected with the north of India; and this is borne out by language, customs, and subsequent history. The ancient North Indian poem *Rámáyana* (dating from 500 B.C. at least) and the inscriptions of Asoka (250 B.C.) prove early intercourse between North India and Ceylon,

BUDDHIST PROCESSION IN KANDY: THE ANNUAL PERAHERA.

Photo by the Colombo Apothecaries' Company.

and the chronicles, compiled in Pali in the fourth and fifth centuries A.D. out of the archives of the great Buddhist monastery at Anuradhapura (it is the peculiar distinction of the Sinhalese among Indian peoples to possess such histories), describe the establishment of the Buddhist religion in the Island by Aryan influences in the third century B.C. These same chronicles ascribe, and with all probability, the previous civilization of the Island to Aryan immigration.

SINHALESE VILLAGER.

The Sinhalese language is closely akin to the Sanskrit; that is, it is one of that group of Indo-Aryan languages of which Sanskrit is the literary type. It comes nearer probably to the Bengali than to any other of the present forms of this group.

SINHALESE BASKET WOMEN.

The Veddas (or "hunters"), who perhaps represent the aboriginal pre-Aryan population of Ceylon, are a race of great ethnological interest. It may be doubted whether a distinction of race has been established, and certainly the peculiarities of the Veddas have been exaggerated—*e.g.*, that they cannot laugh! Some of them have been induced to adopt a civilized life, and are called "Village Veddas;" these speak Sinhalese or Tamil, according to their neighbourhood; they fish,

hunt, or even farm; and a few of them are genuine Christians. But there are still left in the interior some of the genuine "Rock Veddas" who live by the bow and the snare; store their meat, preserved in honey, in hollow trees; and avoid intercourse with other men; and who, formerly at least, used to bargain with their Sinhalese neighbours by leaving at the edge of the forest a model of the tool or article which they wanted to buy and the haunch of venison with which they proposed to pay for it, coming afterwards in silence and secrecy to carry off their purchase. The Veddas are enumerated in the Census of 1901 at 3,971.

COLOMBO CHETTY.

NATUKOTAYA CHETTY.

The Tamils are of the *Dravidian* race. They have immigrated to Ceylon from Southern India in two ways: as invaders and conquerors in past centuries, and in search of labour on the coffee and tea estates in recent times. The former have settled in the Northern and part of the Eastern Provinces, where they and their language predominate, and they are to be found in all the larger towns elsewhere. The latter class are to be found in the planting districts, where their labour is invaluable. The majority of the Tamils profess the

Hindu, principally the Sivite religion ; but the peninsula of Jaffna, in the north of Ceylon, which is entirely peopled by Tamils, has since 1816 been uninterruptedly the scene of the labours of the American Mission, which conducts its operations under the directions of one of the most remarkable associations for the dissemination of Christianity that has existed since the Reformation, the American Board of Commissioners for Foreign Missions, which has its headquarters at Boston (Mass.).

The so-called Moors or Moormen are Mohammedans of Arab origin. They are chiefly engaged in petty trade, and live rather aloof from the other races, with their own institutions and laws, taking very little part in public affairs.

The Burghers or Eurasians are of Portuguese, Dutch, and English descent. The higher classes fill the learned professions, are members of the Civil and Clerical Services, while the lower classes are artisans and mechanics.

MALAY GIRL.

English is the language of the Burghers, but a small number of the lower class speak a debased Portuguese. They are all Christians.

The Malays, who are also Mohammedans, are chiefly descendants of soldiers imported from the Malay Peninsula. They largely recruit the ranks of the local police, and are also found as prison warders, office messengers, and domestic servants. One of their exclusive occupations is working in rattan or cane, from which they turn out serviceable chairs, baskets, &c.

By the Census of 1901 the total population was found to be 3,565,954, composed of the following races :—

Sinhalese	...	2,330,807	Malays	...	11,902
Tamils	...	951,740	Other races	...	9,718
Moors	...	228,034	Europeans	...	6,300
Burghers	...	23,482	Veddas	...	3,971

and according to religious belief—

Buddhists ...	2,141,404	Christians ...	349,239
Hindus ...	826,826	Mohammedans...	246,118

Others 2,367

Administration, Revenue and Judiciary.

Ceylon belongs to the class of what are known as Crown Colonies, in which the Crown has the entire control of legislation, while the administration is carried on by public officers under the control of the Home Government. It is administered direct from the Crown by the Secretary of State for the Colonies, with whom, at the Colonial Office in Downing street, the Governor communicates on all matters of State. Locally, the executive and administrative power is in the hands of the Governor, who is assisted by an Executive Council of five official members.

The appointment of Governor is during His Majesty's pleasure and is, as a rule, confined to a period of six years from the date of assumption of duties. The salary attached to the office is Rs. 80,000 per annum, with three residences: the Queen's House at Colombo, the Pavilion at Kandy, and the Queen's Cottage at Nuwara Eliya.

The Executive Council consists of the Lieutenant-Governor and Colonial Secretary, the Officer Commanding the Troops, the Attorney-General, the Auditor-General, and the Treasurer.

The Legislative Council consists of the Governor, the above five Executive Councillors, the Government Agents of the Western and Central Provinces, two other official and eight unofficial members appointed by the Governor, viz., one Low-country Sinhalese, one Kandyan Sinhalese, one Tamil, one Burgher, one Mohammedan, one Planting Member, one Mercantile Member, and one General European Representative.

Administrative Departments.—The servants of Government are divided into "Civil Servants and other servants of Government in the Financial, Revenue, Judicial, Ecclesiastical, Scientific, Educational, and General Departments."

The Civil Service.—The Civil Service, which consists of about 80 members, is in two divisions, the Higher Division recruited by competitive examination in England, and the Lower Division to which appointments are made locally by the Governor. It comprises the Financial, Revenue, and part of the Judicial Branches, the heads of the Educational Branch and of two General Departments, viz., the Police and Prisons Department and the Post Office.

The Scientific Departments of the Government Service are the Public Works Department, the Irrigation Department, the Survey Department, the Forest Department, the Railway Department, the Royal Botanic Gardens, and Colombo Museum.

The Judicial Department includes the Supreme Court, the Attorney-General's Department, and the District Judges of Colombo and Kandy.

The General or Miscellaneous Departments include the Post and Telegraph Department, the Civil Medical Department, the Department of Public Instruction, the Police and Prisons, the Harbour Departments, the Government Stores, and the Government Printing Office.

Provincial Administration.

For purposes of general administration the Island is divided into nine Provinces presided over by Government Agents, who in addition to collecting the revenue are responsible for the good order of their Provinces, in which they make frequent tours. They are in constant personal communication with the headmen and with the inhabitants, both European and Native, whose wants and interests they bring to the notice of Government, between which and the people through their headmen they are the direct intermediaries.

The Provinces are, with two exceptions, subdivided into Districts. Each Government Agent, in addition to his provincial charge, has immediate charge of his home district (the district in which his provincial capital is situated), the out-districts being placed in charge of Assistant Government Agents. The office of a Government or Assistant Government Agent is styled a Kachcheri.

The nine Provinces, and their population, are as follows :—

Province.	Population.	Province.	Population.
Western ...	925,212	North-Western ...	353,703
Central ...	622,832	North-Central ...	79,101
Northern ...	342,109	Uva ...	191,925
Southern ...	566,690	Sabaragamuwa ...	321,262
Eastern ...	174,156		

Under the Government Agents and Assistant Agents, and in charge of headmen's divisions varying in size from that of a small English county down to villages and hamlets, are a vast number of Native Chiefs, or as they are usually styled Headmen, of various grades. The superior chiefs receive regular salaries from Government, but most of the minor headmen are unpaid. But they are in the receipt of fees and pecuniary rewards for good service.

Local Self-Government.

The internal affairs of the three chief towns—Colombo, the capital (population 154,691), Kandy (population 26,386), and Galle (population 37,165)—are entrusted to Municipal

Councils, and those of seventeen smaller towns to Local Boards. Provincial and District Road Committees maintain and control the minor thoroughfares, as well as the rest-houses or public inns kept up for the convenience of travellers at distances of 12 or 15 miles apart.

In the villages the Gansabhawas or Village Committees play an important part, managing as they do a variety of the local affairs of these little communities, such as the construction and repair of village paths and footbridges, the erection and maintenance of village schools, the regulation of fisheries and of the supply of water to the rice fields, and so on.

The revenue, which continues to rise by leaps and bounds, is, in round figures, Rs. 29,400,000, or $9,800,000, to which Customs Duties and the Government Railway contribute, roughly, Rs. 8,000,000 apiece. The next largest contribution is derived from "Licenses, Excise, and other Internal Revenue," which amounts to Rs. 6,000,000. This includes the revenue yielded by arrack, salt, tolls, revenue stamps, and fines. Rs. 1,700,000 is derived from Fees of Court or Office, Payments for Specific Services, and Reimbursements. The chief items among these are judicial stamps and warehouse rent. The Post Office contributes Rs. 1,000,000, the sale of Waste Land Rs. 500,000, and the sale of Government Property, principally timber, realizes about Rs. 400,000.

The larger items of public expenditure are as follows, in round figures :—

	Rs.		Rs.
Public Debt ...	2,800,000	Railways ...	5,550,000
Pensions ...	1,250,000	Education ...	930,000
Hospitals and Dispensaries ...	1,290,000	Provincial Administration ...	900,000
Military Expenditure	2,150,000	Police ...	700,000
Post and Telegraphs.	1,100,000	Civil Service ...	680,000
Public Works ...	4,300,000		

The Public Debt is about Rs. 75,000,000.

The money in circulation is the Indian silver rupee, half-rupee, and quarter-rupee, and Ceylon subsidiary coins both of silver and copper, and gold sovereigns which are legal tender at the fixed rate of fifteen rupees to the sovereign. Ceylon has its own Government currency note issue.

The principal articles of import are rice, which is the staple food of the people, cotton piece-goods, with which they are clothed, salt fish, which gives a savour to their otherwise chiefly vegetable diet, sugar, metals, and petroleum ; and the principal articles of exports are tea, the oil and other produce of the cocoanut tree, plumbago, cinnamon, cacao, arecanuts, citronella oil, and rubber.

There are export duties on tea, coffee, cacao, and cinchona, levied in order to provide funds for furnishing medical aid to immigrant estate labourers, and a further small export duty on tea, levied at the request of the planters to provide funds for the purpose of furthering an increased consumption of Ceylon tea in foreign lands. There is also an export duty on plumbago and on arrack spirit, on elephants, and on the horns of the sambur and spotted deer. The duties on plumbago and arrack are imposed for revenue purposes; that on elephants, which amounts to Rs. 200 per head, is levied, as well as other precautions taken, for the preservation of these majestic animals, comparatively large herds of which still live under strict protection in the jungles of Ceylon. The export duty on deer horns is levied partly in the interests of the food supply of the Island and partly in the interests of sport.

The basis of the law of the maritime districts is the Roman-Dutch Law, but there are four other systems of common law prevailing in Ceylon, viz., the *Thesawalamai* or customs of the Tamil inhabitants of Jaffna, the laws and usages of the Mohammedans, the *Mukkuva* law or custom regulating the succession to intestate property of the Mukkuvas of Batticaloa, and the *Kandyan* Law. The Law of England prevails in respect of partnerships, joint stock companies, banks and banking, maritime matters, bills of exchange, promissory notes and cheques, and other commercial matters. The local statutes are termed *Ordinances*. All the proceedings in all the courts, except the village courts or Gansabhawas, are carried on in English with the aid of interpreters. The Supreme Court consists of the Chief Justice and three Puisne Justices. It has an original criminal jurisdiction, and decides both civil and criminal appeals from the lower District Courts, Courts of Requests, and Police Courts. The Supreme Court also admits and enrols Advocates and Proctors, who correspond to Barristers and Solicitors in England.

The Attorney-General acts on all occasions as the legal adviser of the Government and prepares its legislative enactments. He also acts as Grand Juror and supervises the criminal work of the Magistrates. He is assisted in his various duties by the Solicitor-General and by several Crown Counsel. The ranks of the legal profession in Ceylon are almost exclusively filled by natives of the Island, either Burghers, Sinhalese, or Tamils.

Irrigation.

The irrigation works of the Colony are among the most remarkable in the world.

No better description of the initiation of irrigation in Ceylon exists than is given in Sir Emerson Tennent's celebrated work:—

"It was to the Hindu kings who succeeded Wijayo that Ceylon was indebted for the earliest knowledge of agriculture, for the construction of reservoirs, and the practice of irrigation for the cultivation of rice.

"The first tank in Ceylon was formed by the successor of Wijayo, 504 B.C., and their subsequent extension to an almost incredible number is ascribable to the influence of the Buddhist religion, which, abhorring the destruction of animal life, taught its multitudinous votaries to subsist exclusively upon vegetable food. Hence the planting of gardens, the diffusion of fruit trees and leguminous vegetables, the sowing of dry grain, the formation of reservoirs and canals, and the reclamation of land in situations favourable for irrigation.

"It is impossible to over-estimate the importance of this system of water cultivation in a country like the north of Ceylon subject to periodical droughts. From physical and geological causes the mode of cultivation in that section of the Island differs essentially from that practised in the southern division; and whilst in the latter the frequency of the rains and abundance of rivers afford a copious supply of water, the rest of the country is mainly dependent upon artificial irrigation and on the quantity of rain collected in tanks or of water diverted from streams and directed into reservoirs.

"The mountain ranges, which tower along the south-western coast and extend far towards the eastern, serve in both monsoons to intercept the trade winds and condense the vapours with which they are charged, thus ensuring to those regions a plentiful supply of rain. Hence the harvests in those portions of the Island are regulated by the two monsoons, the *yala* in May and the *maha* in November; and seed time is adjusted so as to take advantage of the copious showers which fall at those periods.

"But in the northern portions of Ceylon, owing to the absence of mountains, this natural resource cannot be relied on. The winds in both monsoons traverse the Island without parting with a sufficiency of moisture; droughts are of frequent occurrence and of long continuance, and vegetation in the low and scarcely undulated plains is mainly dependent on dews and whatever damp is distributed by the steady sea breeze. In some places the sandy soil rests upon beds of madrepore and coral rock, through which the scanty rain

VEDDAS, THE ABORIGINES OF CEYLON.

Photo by Sheen & Co.

percolates too quickly to refresh the soil; and the husbandman is entirely dependent upon wells and village tanks for the means of irrigation.

"In a region exposed to such vicissitudes the risk would have been imminent and incessant had the population been obliged to rely on supplies of dry grain alone, the growth of which must necessarily have been precarious owing to the possible failure or deficiency of the rains. Hence frequent famines would have been inevitable in those seasons of prolonged dryness and scorching heat, when 'the sky becomes as brass and the earth as iron.'

"What an unspeakable blessing that against such calamities a security should have been found by the introduction of a grain calculated to germinate under water; and that a perennial supply of the latter, not only adequate for all ordinary purposes, but sufficient to guard against extraordinary emergencies of the seasons, should have been provided by the ingenuity of the people aided by the bounteous care of their sovereigns.

"Simultaneously with the construction of works for the advancement of agriculture the patriarchal village system, copied from that which existed from the earliest ages in India, was established in the newly settled districts; and each hamlet, with its governing 'headman,' its artisans, its barber, its astrologer, and washerman, was taught to conduct its own affairs by its village council, to repair its tanks and water-courses, and to collect two harvests in each year by the combined labour of the whole village community."

The same author is drawn upon for the following account of four typical works of irrigation:—

"**Giant's Tank.**—Our party passed the Taikum, the immense causeway of cut granite, 250 yards in length and upwards of 15 feet high, by which it was attempted to divert the waters of the river into the canal that was designed to supply the Giant's tank. None of the great reservoirs of Ceylon have attracted so much attention as this stupendous work. The retaining bund of the reservoir, which is 300 feet broad at the base, can be traced for more than 15 miles, and, as the country is level, the area which its waters were intended to cover would have been nearly equal to that of the lake of Geneva.*

"**Kalawewa,** in the North-Central Province, was formed by King Dhatu Sẹn about the year 460 A.D. by driving an embankment across the Kala-oya, which flowing from the

* This tank has been recently restored and is capable of irrigating 20,000 acres of land.

vicinity of the great temple at Dambulla reaches the sea at Kalpitiya. The work was commenced on the grandest imaginable scale. The area submerged was more than 40 miles in circumference, and the waters were thrown back by the embankment till they overflowed the low-country round the rock which overhangs the temple at Dambulla. In the opposite direction a canal more than 60 miles in length communicated with Anuradhapura. The retaining bund was 12 miles long, and the spill was formed of hammered granite.*

"**Minneri.**—One of the most lovely of these artificial lakes was enclosed by Maha Sen, 275 A.D., and together with 80,000 amunams (say 200,000 English acres) of ground which it waters, was conferred on the Jetavanarama Vihare. Universal acclaim pronounces Minneri to be the most charming sylvan spot in Ceylon. The reservoir is upwards of 20 miles in circumference, but as it lies embayed at the confluence of numerous valleys separated by low-wooded steeps, no point on its margin commands a view of its entire expanse. The whole scene—the hills, the hanging woods, and the glassy waters—seemed to my mind like visions of Killarney warmed and illumined by an Eastern sun. We rode for a mile along the bund, which, although overgrown with lofty trees, remains nearly perfect, and the ancient conduit still gives issue to the pent-up flood that, after fertilizing a considerable area, flows in a broad stream to the Mahaweliganga.†

"**Paduvilkulam.**—The tank itself is the basin of a broad and shallow valley, formed by two lines of low hills which gradually sink into the plain as they approach towards the sea. The extreme breadth of the enclosed space may be 12 or 14 miles, narrowing to 11 at the spot where the retaining bund has been constructed across the valley; and when this enormous embankment was in effectual repair and the reservoir filled by the rains, the water must have been thrown back along the basin of the valley for at least 15 miles.

"The command of labour must have been extraordinary at the time when such construction was successfully carried out, and the population enormous to whose use it was adapted. The number of cubic yards in the bund is upwards of 17 millions, and at the ordinary rates of labour in this country must have cost £1,300,000, without including the stone facing on the inner side of the bank. The same sum of money that would at the present day be absorbed in

* This tank was restored about fifteen years ago.

† This work is now under restoration, and when complete will irrigate 15,000 acres.

making the embankment at Paduvil would be sufficient to form an English railway 120 miles long, and its completion would occupy 10,000 men for more than five years."

It is estimated that on the completion of the eighteen irrigation works now in hand at a cost of Rs. 5,000,000, more than 162,000 acres, or 250 square miles of land, now mostly covered with scrub jungle, will be added to the irrigable and the cultivable area in the Colony.

The restoration and maintenance of these gigantic works and of the thousands of minor tanks and channels, some

CEYLON DHOBIES AT WORK.

dependent on the large works and others self-contained, is one of the tasks to which the British Government has addressed itself with unswerving assiduity, especially during the last thirty years, and a result is being slowly but surely reaped, in abundance where before was famine, health in the place of sickness, and golden fields of corn where once roamed the elephant and the bear; townships have taken the place of squalid huts, and a robust population now tills the erstwhile impenetrable jungle, where darkness and gloom reigned supreme and over which brooded the fiend malaria.

Transport.

The traveller to Ceylon has the choice of numerous good and swift steamship lines to Colombo, which is distant 7,083 miles from London *viâ* Suez and Aden. The four great mail

companies, the Peninsular and Oriental, the Orient-Pacific, Norddeutscher Lloyd, and Messageries Maritimes, run steamers at frequent intervals from London, Bremen, Antwerp, Southampton, Marseilles, Genoa, and Naples. The return fares are from London or Bremen about £80 first, £50 second class. A very popular line is the Bibby, from Liverpool and Marseilles (return fare, first class only, from Liverpool £74 10*s*., from Marseilles £69 10*s*.). Other well-known lines are the British India, the City, the Nippon Yusen Kaisha or Japanese line (noted for its cheapness), and the Austrian Lloyd, from Trieste (return fare from Trieste £42 10*s*., from London, including rail *viâ* St. Gothard, £55).

A steamer service round the Island is carried on by the Ceylon Steamship Company, whose two vessels, the Lady Havelock and Lady Gordon, voyage round the Island alternately south-about and north-about from Colombo weekly, the first class fare round the Island being Rs. 125.

The Ceylon Railway System, which is owned and worked by the Ceylon Government, is one of the most valuable assets of the local exchequer, the receipts in 1902 having been Rs. 7,975,506·31. The total mileage open is 378. The Main Line, Colombo to Bandarawela, 160 miles in length, rises from a few feet above the sea level at Colombo to 6,224 feet above the sea at the summit near Pattipola, 139 miles from Colombo, and thence falls to 4,036 feet above the sea at Bandarawela. The works and inclines between Rambukkana, 313 feet above the sea (52 miles 11 chains), and Kadugannawa, 1,698 feet above the sea (65 miles), and also between Nawalapitiya (87 miles), 1,913 feet above the sea, and the terminus at Bandarawela, are of very exceptional difficulty, magnitude, steepness, and length, and perhaps justly entitle the railway to rank among the remarkable railways of the world in these respects. There is no other railway of the same gauge (5 feet 6 inches) rising to an equal altitude above sea level, nor another instance of the use of curves having so small a radius as 5 chains (330 feet) with that gauge.

An extension on the same gauge to the north of the Island, 198 miles, is in progress, and will probably be opened to traffic in 1905.

There are branch feeder lines on a 2-feet 6-inch gauge from Nanu-oya through Nuwara Eliya, the sanitarium of the Island, to Ragalla, 19 miles, which rises to 7,000 feet above sea level, and is probably one of the steepest hill lines in the world where a cog connection is not used. The sharpest curves are 80 feet radius, and the steepest gradient is 1 in 23·87; and another of 48 miles from Colombo to the great Kelani

Valley tea district on the same gauge, but in a comparatively flat country.

There are 163 miles of canals, navigable by barges, in the Island, mostly engineered by the Dutch, and on some of these light draught passenger steam boats ply daily. Of macadamized roads the mileage is 2,605, of gravelled roads 648, and of natural roads 393. All the above are principal thoroughfares in charge of the Public Works Department, while there is a complete network of minor roads, both for wheeled traffic and bridle paths, constructed and maintained by local Road Committees.

DOUBLE PADDA BOAT ON RIVER.

The steepness of the gradients, the torrential rains, exuberant vegetation, and fierce tropical heat all combine to render road construction and maintenance in Ceylon a very costly affair, but Ceylon is justly renowned for the engineering skill displayed in the formation of its roads and the solidity and evenness of their surface, which is so necessary when the bulk of the traffic is carried on by the slow-moving and ponderous bullock cart of the country.

Tramways so far have been opened in Colombo only. The Colombo Tramway System is "an electric tramway worked on the overhead trolley system at a pressure of 550 volts." Work on the track, overhead construction, and

power station was commenced in September, 1897, and the line was formally opened for traffic on January 12, 1899. The total length of the tramway route is 7 miles, divided practically equally into two routes, one between the Fort and Kelani river, and one between the Fort and Borella. There are two classes for travellers, and the fares are charged by sections and not by mileage. Each route consists of six sections, the first and second class fare for any distance up to three sections being 10 and 5 rupee-cents respectively. Beyond this distance and up to six sections, *i.e.*, the full distance of any one route, the fare is 20 and 10 rupee-cents respectively. The average rates charged per mile are therefore approximately 6 and 3 rupee-cents respectively for first and second class passengers. The total number of passengers carried annually is about 7 millions.

There are in the Island 150 post offices, 85 of which are combined post and telegraph offices, besides 162 village receiving offices and 23 railway receiving offices.

The revenue and expenditure of the Postal and Telegraph Department in 1902 was :—

	Revenue.	Expenditure.
1902 ...	Rs. 1,050,014 ...	Rs. 1,081,797

There were 1,374 employés in the Postal and Telegraph Department in 1902.

Local letters posted in Ceylon are addressed in several languages, but principally in English, Sinhalese, and Tamil. The mails are conveyed by train, horse coaches, bullock coaches, and runners, of whom over 200 are employed.

The Telegraph System in Ceylon comprises 1,438 miles of line and 2,451 miles of wire ; all the principal towns and the greater number of lesser ones are thereby connected. The charges on inland telegrams are as follows :—

Class.	First Eight Words or Groups of Three Figures.	Each Additional Word or Group of Three Figures.
Urgent ...	75 cents ...	10 cents
Ordinary ...	25 „ ...	5 „

Connection with the Continent of India and the rest of the world is established by means of submarine cables laid across Palk's Strait on the north-west of the Island.

The lines which cross from the west to the east coast are carried over the mountain ranges which form the backbone of the Island. They rise from sea-level to an altitude of 6,500 feet for half the distance, and descend from this elevation to sea-level over the other half. Where the country is rough and the passes through it tortuous the supports are planted

on a few salient points, and the wires in these cases span deep valleys and gorges, several of the spans being not less than 800 yards in length. The lines traverse the Island from the extreme south to the extreme north, Dondra Head to Point Pedro, a distance of 400 miles. One follows the south and west coast to Colombo and *viâ* Puttalam and Mannar to Jaffna and Point Pedro, while the other deviates from Colombo eastwards and runs alongside the railway to Kandy, which is at an elevation of 1,700 feet, and from Kandy to Matale, 700 feet lower, and here civilization practically ends.

HACKERY AND JINRICKSHA.

Beyond Matale the lines follow the great northern trunk road for 200 miles, passing through dense forests and a wild and sparsely populated country.

In Colombo there is a Telephone System with 38 miles of posts, 215 miles of wire, and 200 telephone instruments in use.

In strange contrast with the time when it was the policy of the Kandyan kings to render their territories as inaccessible as possible, and when ladies of rank rode through the dim solemnity of the forests *à la fourchette* on the necks of slaves, are the roar of the railway train, the bell of the bicycle, and the not infrequent clang of the motor car, all in their way

signs of progress and becoming common means of transport in Ceylon side by side with the antiquated bullock cart with its thatched tent, slowly grinding wheels, and the strange ejaculations addressed to the oxen by the scantily clad Jehu, and the still more primitive but still existing strings of "tavalams" or pack bullocks, each with two bags of rice or salt dependent, pannier-wise, from its back, which always "take the wall" and leave to the travelling horseman the giddy prospect of the precipice side of the mountain road.

The Port of Colombo.

Since the first block of the south-west breakwater of the harbour of Colombo, the capital of Ceylon, which is situated on the south-west coast of the Island, was laid by His Majesty the King of England (when Prince of Wales) in 1875, Colombo has become a great port of call for loading and also for transhipping cargo for home and for distribution from London. This breakwater, which is 4,210 feet in length, sheltering 400 acres of water space with a depth of 30 feet at low water, was completed in 1885 at a cost of about £700,000. Fifteen years ago almost all the lines of steamers running from Europe to the East and to Australia began to call at Colombo, both outwards and homewards; and in consequence of the rapid increase in the use of the port it became necessary to consider the question of increasing the sheltered deep water area. Consequently a design was prepared with that object in May, 1893, which contemplated the construction of a north-east breakwater 1,000 feet in length, extending from Mutwal Point, and of an island breakwater 2,670 feet long. These two works have been so arranged as to give, when completed, a northern entrance of 700 feet in width, having a depth of 34 to 30 feet at low water, and a central entrance of 800 feet in width, having a depth of from 39 to 40 feet at low water. The area thus enclosed within the harbour, when fully sheltered, will be 660 acres, which will render Colombo one of the largest artificial harbours in the world. The memorial stone of the new breakwaters was laid in December, 1894, by the Governor, Sir Arthur Havelock. Not long after these designs had been proposed it was decided to construct a graving dock at Colombo for the use of His Majesty's ships and for the accommodation of the numerous vessels using the port. The first sod was cut in March, 1899, by His Excellency Sir West Ridgeway. The length of this dock is 700 feet on floor, the breadth being at entrance 85 feet, and the depth over the sill 30 feet at low water. The cost is being defrayed jointly

COLOMBO BREAKWATER: SOUTH-WEST MONSOON.

Photo by Plâté & Co.

by the Admiralty and the Government of Ceylon. For the repair and overhauling of small vessels a patent slip has been constructed, which is adapted for the accommodation of craft up to 1,200 tons dead weight. A coaling depôt is also being formed, having an area of 24 acres, which will afford storage capacity for 250,000 tons of coal. Dredging with a view to extend the area of deep water within the harbour is likewise in actual progress.

The estimated cost of the breakwater, coaling ground, patent slip, and other works in progress, excepting the graving dock, is £842,130. For the graving dock and the works in connection therewith the estimated cost is £346,700.

Sir John Coode designed the south-west breakwater, and it was executed under his direction, Mr. John Kyle, senior, being the Resident Engineer. The works now in progress, and which are fast approaching completion, were designed by Messrs. Coode, Son & Matthews, Engineers, of Westminster, Mr. J. H. Bostock being the Resident Engineer.

Some idea of the magnitude of the works can be realized from the fact that there are 2,600 free work-people and 700 convicts daily employed upon them, while the three principal divisions stretch over a mile and a half.

At present there are thirty-one berths for ships available during the south-west and thirty during the north-east monsoon, but after the completion of the new breakwaters there will be approximately thirteen more berths available during each monsoon.

During the year 1902, 2,433 vessels with an aggregate tonnage of 4,574,271 tons visited the port of Colombo.

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COLOMBO CLUB AND GALLE FACE HOTEL.

CHAPTER II.

ARCHÆOLOGY.

BY

H. WHITE, Ceylon Civil Service.

AN Archæological Survey of the Island, which is extremely rich in ancient historical remains, has been in progress for the last fifteen years. Its scope contemplates an accurate description, illustrated by plans, measurements, drawings, or photographs, of such remains as most deserve notice.

The work of the Archæological Survey comprises exploration, excavations, epigraphical works, and a topographical survey. Some of the most interesting historical remains in the Island are the sculptural stones of Anuradhapura, which was the capital of Ceylon about 300 years before the Christian era; the *frescoes* of Sigiriya or the Lion's Rock, 1,400 years old, perhaps the most unique paintings in the world; lithic inscriptions of vast age; and palm-leaf manuscripts, comprising historical, poetical, and religious works of an antiquity dating several centuries before Christ; as well as bronze and stone Buddhas, colossal lions, inscribed monolithic pillars, friezes and carved stone windows, coins, pottery, ivory, brass and copper work, and other relics of a buried but highly civilized past.

The Sinhalese belong to the Aryan race, a Sanskrit-speaking people who came from Central Asia and entered India

across the Upper Indus probably 3,000 years before Christ. The traditional date of the landing of the Sinhalese in Ceylon under Wijaya is 543 B.C. Their religion is Buddhism, of which the founder was born in India 623 B.C., and it was introduced into Ceylon from the neighbouring continent in the third century B.C. Ceylon, of all known Buddhist countries, contains a complete series of Buddhist monuments extending from 250 B.C. to the present day, and in its great chronicle the *Mahawansa* and other Sinhalese scriptures it possesses a tolerably authentic account of the building of

RUINS OF THE DEMALA MAHA SEYA AT POLONNARUWA.

these monuments and of the purposes to which they were dedicated. The ancient capital Anuradhapura continued to be the capital of Ceylon for ten centuries, and, alone of all Buddhist cities, retains nearly a complete series of the remains of its ancient grandeur, among which are its stupendous dagobas, of which the origin is well said to have been "the ambition to expand the earthen mound which covered the ashes of the dead into the dimensions of the eternal hills, the earliest altars for adoration and sacrifice."

Amongst the aborigines of Ceylon the instinct of worship awakened by the sublimities of nature probably constrained some to regard with awe and veneration the majestic mountain known as Adam's Peak, a solitary alp towering above the loftiest ranges of hills to a height of 7,000 feet. In the rock that crowns the summit of the mountain is a hollow claimed by Brahmans as the footstep of Siva, by the Buddhists of Buddha, and by the Mohammedans of Adam, and round this sacred spot the devotees of all races to this day meet in

ASCENT OF SIGIRIYA.

peaceful reverence. A picture of the shadow thrown by the Peak is among the illustrations of this book. (See page 156.)

Another ancient scene of mountain worship in Ceylon is the sacred hill of Mihintale, so named after the missionary Prince Mahindo, son of King Asoka, who alighted on its summit when arriving in Ceylon from the neighbouring continent of India to preach the religion of Buddha in the year 307 B.C.; it was here that he died, 267 B.C., and on this holy hill his disciples, in remembrance of his virtues,

ANCIENT FORTRESS ROCK OF SIGIRIYA.

Photo by Skeen & Co.

bestowed the name of their teacher. "I will lift up mine eyes unto the hills, from whence cometh my help."

Mihintale, aptly styled "a mountain carved into a temple," is an isolated hill rising to a height of upwards of a thousand feet, and its summit is reached by over 1,800 steps of granite slabs 15 feet wide, and from the top is obtained a magnificent view across Ceylon from sea to sea.

From Mihintale to Anuradhapura, a distance of 8 miles, is the *Via Sacra* of the Buddhist priesthood, a road traversed by chariots 2,000 years ago, when the pious monarch Deweni-piyatissa sent an escort to bring Mahindo to the capital city.

A SIGIRIYA FRESCO.

By the preaching of Mahindo this king and forty thousand of his subjects were converted to the new religion.

At Anuradhapura itself the most venerated object is the sacred Bo-tree (*Ficus religiosa*), probably the oldest historical tree in the world. It was brought to Ceylon by Mahindo and his sister Sanghamitta from India as a cutting from the parent tree at Magadha in Northern India in 288 B.C.; its age is a matter of historical record, and its conservancy has been an object of solicitude to successive dynasties for 2192 years.

Among the ornaments of the enclosure in which the Bo-tree stands is a "moonstone," or semi-circular stone slab, which

forms the doorstep to the principal entrance. Its ornaments consist of concentric fillets, the three innermost of which represent the bud, leaf, and flower of the lotus, the central one the row of the Hansa, or sacred goose, and the outer one a procession of the horse, elephant, lion, and bull. An illustration of one of these moonstones is given below.

MOONSTONE AND STEPS, ANURADHAPURA.

Of the dagobas of Ceylon, akin to the stupas of India and the pagodas of Burma and China, the largest and most renowned are situated in Anuradhapura itself.

The Buddhist dagobas, descendants of the sepulchral tumulus of the Turanian races, were erected to contain particles of the bodily remains of Buddha or other relics. They are of a rounded or domical, sometimes bell-shaped form, and were built of large sun-dried bricks, coated externally with lime plaster and surmounted by a pedestal and spire.

One of the largest of these stupendous monuments was the Abhayagiri Dagoba, originally 405 feet high, or 50 feet higher than St. Paul's Cathedral, London, and standing on a platform eight acres in extent. In its present somewhat ruined state it reaches an altitude of 230 feet from the ground. This dagoba was erected in the year 87 B.C.

It has been calculated that to build one of such solid masses of masonry as the larger dagobas of Anuradhapura would at the present day occupy 500 men for seven years, and that the

cost would be $3,000,000. The oldest of these structures was erected in the year 307 B.C., and the latest in the year 276 A.D.

In their present state these mountains of masonry more nearly resemble natural features in the landscape than the mere work of men's hands, covered as they are with lofty trees whose roots have taken firm hold in the crumbling brickwork; but in their pristine grandeur, their stately domes glistening like white marble, crowned with gilded cupolas, surrounded by colonnades of statuary, and embowered in dense foliage, they must have presented a scene calculated to impress the most unimpassioned observer.

TEMPLE OF THE TOOTH, KANDY.

Alike defiant of decay and triumphant over time, these stupendous relics of a bygone age are invested with a singular interest as monuments of an age before the people of the East had learned to hollow caves in rocks or elevate temples on the solid earth.

These religious monuments possessed a corporate character, and to their maintenance and repair were dedicated thousands of broad acres of rice land.

This leads to another branch of our subject, viz., the ancient reservoirs, canals, and other artificial irrigation works of Ceylon which the cultivation of rice rendered necessary in

the drier portions of the Island, such as the North-Central Province where the old capital Anuradhapura lies. Wide districts rendered fertile by the interception of a river and the formation of suitable canals were appropriated to the maintenance of the local priesthood and thousands of broad acres dedicated to the repair of a single dagoba.

Among the more notable of these ancient engineering feats are the impounding of the waters of a river at Kalawewa, which formed a reservoir 40 miles in circumference,

STATUE OF KING PARAKKRAMA BAHU AT POLONNARUWA.

with an artificial embankment 12 miles long, and the formation of a canal 60 miles in length to convey the fertilizing stream to Anuradhapura. This tank was undertaken in the year 460 A.D. This work, which has recently been restored by the British Government, is still fulfilling its object of irrigating rice land.

There are fifty or sixty of these large irrigation works in Ceylon, while the number of lesser village tanks is reckoned by the thousand.

The city of Anuradhapura was abandoned as the capital towards the close of the eighth century A.D., and the seat of Government fixed at no very great distance at Polonnaruwa, the ruins of which, though much more modern in date and less pure in style, are scarcely less interesting than those of the earlier city.

It was much enriched and beautified in the twelfth century by King Prakkrama Bahu, a photograph of whose statue is given in the previous page.

Among the buildings of which the ruins remain at Polonnaruwa is the Dalada Maligawa, or temple of the Sacred Tooth-relic, built 1198 A.D. as a shrine for the so-called tooth of Buddha.

ROCK TEMPLE AT ISURUMINIYA.

The traditional history of this remarkable relic, which has for so many centuries commanded the unreasoning homage of millions of devotees, is as follows.

After the funeral rites of Gautama Buddha had been celebrated, 543 B.C. at Kusinara in India, his left canine tooth was carried to Dantapura, where it was preserved for 800 years, whence it was brought to Ceylon in the fourth century A.D. It was preserved at Polonnaruwa for many years.

It is now carefully enshrined in another much more modern and better known Dalada Maligawa, or Temple of the Tooth, in Kandy, which became the capital of Ceylon in the middle of the thirteenth century A.D.

The cave or rock-cut temples of Ceylon, still used for the celebration of the same rites to which they were dedicated twenty centuries ago, are natural caverns slightly improved by art, advantage being taken of the shelter of overhanging rocks and entrances constructed by the application of masonry façades embellished with architectural decorations, as a rule of no great merit.

INTERIOR OF DAMBULLA TEMPLE.

The most celebrated of these rock temples is that at Dambulla, between Kandy and Anuradhapura, consisting of five chambers, in one of which is a gigantic recumbent statue of Buddha carved out of the solid rock and measuring 47 feet in length.

Ceylon is rich in rock and cave inscriptions, dating from the first century B.C., of which the contents are frequently religious, containing grants to temples, and also relating to the construction of irrigation works. Written literature from a very ancient period is preserved in olas, or strips of palm-

THUPARAMA DAGOBA, AND ANCIENT PILLARS, AT ANURADHAPURA.

Photo by F. W. Bois.

leaf, on which the characters were inscribed with an iron stile, the writing being rendered legible, and the pages at the same time secured from the ravages of insects by the application of charcoal compounded with a fragrant oil. Grants of land and other very important documents were engraved on strips of copper.

Of great ethnological interest are the Veddas, a remnant of the aboriginal inhabitants of Ceylon. The Veddas, who lurk in the forests in the eastern parts of the Island, subsist upon the produce of the chase, which they secure by the use of the bow and arrow. Among their habits is that of preserving the flesh of deer, &c., in honey and storing it in the hollows of trees, closing the apertures with clay, and that of exchanging their superfluous venison with their civilized neighbours for salt, iron, cloth, &c., by a curious system of barter, leaving the flesh and models of the articles they require in exchange, at the edge of the jungle overnight and returning at daybreak to disappear with the produce of this surreptitious trade.

A few thousands of these specimens of man in a very primitive stage of civilization, or rather want of it, still exist in the remoter jungles of the eastern side of the Island.

The interest in antiquarian research in Ceylon is well maintained not only by the Archæological Survey, but by independent scholars and by the Ceylon Branch of the Royal Asiatic Society of Great Britain, whose journals extend back to the year 1845. A complete list of works dealing with the history, religions, and antiquities of Ceylon is given among the list of books relating to Ceylon elsewhere in this Handbook.

MILITARY BARRACKS FROM GALLE FACE.

CHAPTER III.

EDUCATION IN CEYLON.

BY

J. HARWARD, M.A., Director of Public Instruction, Ceylon.

Introductory.

THE Tropical Colony is one of the problems of the twentieth century. How to govern such a dependency without the deterioration either of rulers or of ruled, or possibly of both;—how to transplant into minds in one stage of evolution ideas which belong to another, without at the same time destroying the sources of moral and social order;—how to encourage independence without undermining loyalty;—how to make an idle population industrious without reverting to slavery;—these and other questions bearing on the problem are easier to raise than to answer. In the United States it is hardly necessary to point out that they are in a great measure educational questions, and that the most important point which a Government taking over a new dependency has to face is the settlement of its educational policy. Are its subjects to be educated at all? If so, on what lines? Should a wholesale measure be introduced, or should the change be made as gradual as possible?

The answers to such questions must depend largely on the circumstances of the people concerned. What is right in dealing with races, like those of Ceylon, that have had in the

past a history, literature, and culture of their own, will probably be wrong in dealing with a population just emerging from barbarism. But they can only be answered at all by one who has actually studied the effects of the introduction of an alien education among people of varying types. Ceylon on a small scale and British India on a large scale are perhaps the best object-lessons that such a student can have before him. Certainly in the history of British India no event, not even the Mutiny, has had such vast and momentous consequences to the country as the decision to introduce education of the European type.

In Ceylon the object-lesson is rendered more picturesque, and perhaps not less valuable, by the fact that more than seventy years passed after the British occupation before any extensive educational policy was organized by Government; and even then want of funds and other causes prevented the carrying out of any complete scheme dealing with the whole population of the Island. The result is that Ceylon at the present time shows a fine assortment of contrasting systems working side by side. From the higher colleges, where you have seen boys working at conic sections or Euripides, you can pass to the seminary for Buddhist priests, where the matter and manner of the teaching are much the same as they were under Parakkrama the Great, where no English is understood, and where you will still see classes studying the Buddhist scriptures in their primitive ola manuscripts. In one street you will find a Mission girls' school with Ceylonese children playing Kindergarten games and being taught in English by a thoroughly trained English lady; in another, not many yards away, you will hear the interminable chant of the Tamil verandah school, with its crowd of urchins squatting on the ground and learning the Tamil alphabet with no other apparatus except their own fingers and the sand of the floor.

In rural districts you will find similar contrasts, though they are fast disappearing. In one Sinhalese village you will see a well-appointed Government school, attended by two or three hundred boys, with desks, blackboards, wall maps, object-lessons, time table, physical drill, and perhaps an admirable school garden. The boys wear petticoats instead of trousers, and talk Sinhalese instead of English, but the whole organization is much the same as that of a good elementary school in England. Go ten miles further on into the jungle, and perhaps you will come to a group of villages which neither Government nor Mission bodies have provided with a school; here education is either non-existent or it is confined to what is called the Pansala school, *i.e.*, the school attached to a Buddhist temple.

There is no more interesting survival in Ceylon than the Pansala school. Centuries ago these schools were a living institution here, as they are to-day in Burma. In Ceylon only a feeble flicker of that life remains ; but here and there you will still find at the village temple a yellow-robed priest seated perhaps under a tree and teaching five or six boys. Each of these holds a scrap of ola manuscript, and they are learning to read from such books as the temple happens to possess. There is a well-defined series of old works on the Sinhalese alphabet and grammar, which is supposed to form the regular course of the Pansala school. But such studies are, as a rule, confined to those intended for the priesthood ; the ordinary village boy at the Pansala school learns nothing except to read and write, and this instruction is imparted by means of books only dimly understood. Many have thought that the Pansala school ought to have been adopted by the English as the means of education in rural districts. But such a step was impossible. The system was practically dead. The people had lost all sense of obligation to send their children to such schools, and there were no means of inducing or compelling the priests to do their duty as teachers.

Historical.

British rule in Ceylon dates from 1796. Our predecessors the Dutch had in most matters of administration a very clear and consistent policy. Education was no exception to this rule. It was placed under a body called the Scholarchal Commission,* consisting of about eight members, lay and clerical, under the presidency of the Dissave of Colombo, the Dutch official who ranked next to the Governor, and during the whole of the eighteenth century there were not only Dutch schools in the principal towns, but also vernacular schools in all the most important parts of those parts of the Island which were held by the Dutch. The village schools were under native teachers, who received a fair rate of pay, and were under the direct supervision of the Proponents or native ministers. Once a year two members, one clerical and one lay, of the Scholarchal Commission visited every school, and a report was drawn up which was submitted to Government and forwarded to Holland. Registers were kept in every school, compulsory attendance was enforced by a system of fines, and during a considerable

* For a full account of this see Journal of the Ceylon Branch of the Royal Asiatic Society, vol. I., p. 105, "The Education Establishments of the Dutch in Ceylon," by the Rev. J. D. Palm.

THE OLD AND THE NEW: PANSALA CLASS AND PHYSICAL DRILL.

Photo by Skeen & Co

part of the eighteenth century the number of children at school in the Dutch territory averaged about 70,000. Even those who had left school were obliged to attend at intervals for a further period of four years and show that they had not forgotten what they had learnt.

The subjects of instruction were mainly religious, and the whole system formed a part of the policy by which the Dutch attempted to bring about the conversion of the entire population of their territories in Ceylon. Political machinery was utilized to carry out this policy, and a motive for conformity was provided by confining all offices, ranks, and titles to professing Christians. The motives of the Dutch Government in Holland seem to have been perfectly sincere, and many of their clergy in Ceylon showed real missionary zeal. But the Dutch Reformed Church of that date was not a type of religion likely to be attractive to the Oriental mind, and it is probably not unfair to say that the efforts of its clergy produced very little in the way of real conviction. The schools, however, must have had beneficial effects and tended to give orderly habits to a people who really required paternal government. The system certainly deserved most respectful treatment from the British when they took over the government of the country.

Organized educational effort was not a familiar idea to the English in the eighteenth century : in England itself it was not felt to be any part of the duty of the State to maintain and direct a system of national education. It is therefore hardly a matter for surprise that no real effort was made to carry on this part of the work of the Dutch in Ceylon. The Rev. J. Cordiner, the Anglican Chaplain of the first English Governor, was appointed Principal of all the schools in Ceylon; but no system was created for making his supervision operative. The Dutch Church was left intact and its ministers allowed to continue their work on reduced pay provided by the British Government. But the amount of the public funds available for education was reduced to a fixed total of £1,500 annually, and the compulsory attendance, which had been the keystone of the Dutch system, was abolished. Schools under clerical supervision continued to be maintained in the towns, but in the course of a few years rural education had ceased to exist.

The loss was recognized and deplored by Government, but no step was taken to remedy it beyond reporting to the Home Government the lamentable lack of clergy in Ceylon. It looks almost as if the Governors of the period cherished the hope that, if only a sufficient number of clergy could be imported, the necessary minimum of education would go

on of its own accord in Ceylon as it did in England. And in the course of time missionary effort did actually do a great deal towards supplying what the country wanted. During the earlier years of the British rule mission work was confined almost entirely to the Roman Catholics; but in 1812 some Baptist Missionaries from England established themselves, and were followed in the course of the next six years by the Wesleyans, the American Mission, and the Church of England. All these bodies, English, Roman, and American, have made schools a prominent part of their work, and to their efforts the country owes a substantial part of such privileges in the way of education as it has enjoyed. It is impossible to understand the present educational condition of the country without having some idea of the nature of the work done by Missions in connection with education, both elementary and higher. For this purpose the American Mission may be taken as a typical specimen. The following short account of its educational work is contributed by the Rev. R. C. Hastings:—

THE EDUCATIONAL WORK OF THE AMERICAN MISSION.

The "American Board of Commissioners for Foreign Missions" is the name of a Society founded in the United States in 1819 for the purpose of carrying the Gospel into foreign lands. It sent its first missionaries to Ceylon in 1815. Three missionaries with their wives and one single gentleman arrived in Colombo, March 22, 1816—five months after sailing from Boston, United States of America. They remained in Colombo for nearly seven months and then left for Jaffna, where they first occupied the stations of Batticotta, Tillipallai, and Uduvil. In 1819 a reinforcement of four men and their wives were added to the Mission, after which owing to the attitude of the Ceylon Government no new helpers were sent from America until 1833.

One of the first things to engage the attention of the missionaries was the subject of education. There was very little desire on the part of the Tamils for either education or civilization. Nevertheless, two "common free schools" were at once established, attended by about 80 children; in two years the number of schools had increased to 13 and the pupils to 600. Believing that confining themselves to village schools only was not the wisest policy, the missionaries made an effort in 1818 to induce a few children to come and live in the Mission House at the stations. This aroused much opposition. To quote from one of the earlier records: "The wildest conjectures were formed as to its design. Some thought that the children were to be enslaved; others that the boys were to be sent into the interior of the Island or to some foreign country as soldiers; none could understand why men of another nation should come to them and, from mere benevolence, offer to feed, clothe, and educate these children." We might add that the estimate for feeding, clothing, and educating each child was placed at £3 a year. In January, 1818, six small boys, aged about seven or eight, were entrusted to the missionaries, and this was the beginning of the boys' boarding schools.

The difficulties in getting girls to study were even greater. "It is not our custom" was the invariable answer given when the parents were asked to send their girls to boarding schools. It was considered a disgrace for a woman to be able to read and write. However, an attempt was made, and in 1823 we had 30 girls studying in our station boarding schools besides 120 boys. Of village schools we had 37 with 1,650 pupils.

The time had now come to make still another advance, and it was decided to start a college for boys for imparting higher education to the most promising candidates taken from the station boarding schools. There was great opposition to this plan, both on the part of the friends of Missions and the Ceylon Government; but these difficulties were in part overcome and an institution for boys started at Batticotta in 1823 called the "Batticotta Seminary." The course of study was in both Tamil and English, and embraced the following subjects:—In the Academical Department, Algebra, Euclid, Conic Sections, Natural Philosophy, Chemistry, Astronomy, Logic, Rhetoric, Mental and Moral Philosophy, Paley's Natural Theology, Butler's Analogy, Classical Tamil, and Sanskrit; in the Normal Department, Arithmetic, Algebra, Grammar, Geography, History, Natural Theology, Tamil Classical Reader, English Bible, &c. Forty-eight names were enrolled in the two departments.

In 1824 the "Female Central School" was started at Uduvil and a few girls admitted. [This is now called the Uduvil Girls' Anglo-Vernacular Boarding School.] "The girls themselves," so wrote one of the missionaries, "though quite young, appeared to feel that there was some impropriety in their learning to read and write; and it was not until they had each the promise of a small gold necklace when able to read fluently in the New Testament that they could be induced to apply themselves successfully to study."

Thus at the close of 1824 the Mission had a boys' college, a girls' boarding school, 5 English primary schools, 5 primary girls' schools, and 32 mixed village schools. The total number under instruction was over 1,800. As was natural, much time was given in the college to comparative study between the Hindu and European systems of chronology, the Puranic and Copernican systems of Geography and Astronomy, &c. The Hindu students thus acquired a more thorough knowledge of their own writings than they do to-day. As fallacies in the Hindu system were exposed the students became more convinced of the truths of Christianity, and we are not surprised to learn that in the first decade or two in the history of the Mission there were many conversions to the Christian faith. In the third triennial report of the Batticotta Seminary (published, by the way, in the Church Mission Press, Nellore, in 1833) we notice that in "April, 1830, the Seminary was favoured with a visit from the Lord Bishop of Calcutta, India, who was accompanied by several other gentlemen. The Bishop spent the greater part of a day in examining the students .... and at the close His Lordship expressed in gratifying terms the pleasure he had experienced." At the annual examination held in September of the same year His Majesty's Commissioners of Inquiry, C. H. Cameron, Esq., and Col. Colebrooke, were present and expressed their gratification at what they had witnessed. Two years later His Excellency the Governor and several other gentlemen were present.

At the close of twenty years we find that the number of village schools had risen to 155 with 5,118 boys and 1,004 girls. In the Seminary there were 151 boys, and in Uduvil Girls' Boarding School 98 girls. In this year—*i.e.*, 1836—the Society spent about £725 for village schools, £622 for the Seminary, and £289 for Uduvil,—a total of £1,636 (say Rs. 16,360) for educational purposes alone. Very little was collected in fees from the pupils.

Since 1836 the history of the Mission has not been one of unbroken prosperity. There have been periods when funds were not forthcoming, and when parts of the work had to be temporarily discontinued. But it is satisfactory to learn that these difficulties have been overcome. Of the present state of the educational work of his Mission Mr. Hastings writes:—

At the close of 1902 we report as follows:—Jaffna College,* with 101 students, *all* boarders, from a Pre-entrance Class up to and including B.A. classes; one training school for boys with 59 pupils, and one for girls with 12; two girls' boarding schools with 150 pupils; one girls' English boarding school with 43 pupils; one industrial school; and 132 English and vernacular grant-in-aid schools with 7,548 boys and 2,757 girls.

The total number under instruction, excluding the industrial school, is 7,708 boys and 2,962 girls—or 10,670 all told—in 138 schools. The school fees collected in 1902 amounted to Rs. 12,892.

It was in connection with the higher education of Colombo that the interest of Government in education first took a practical shape. The first important Government institution, the Colombo Academy, which still exists under a changed name as the Royal College, dates from 1835. It is perhaps more than a coincidence that this is the year of Lord Macaulay's famous Minute, which marks the decision of the Supreme Council of India in favour of a European type of education. The question had been in the air for some time, and though the Government of Ceylon had no official connection with India, the Governor was doubtless aware of the discussions which had taken place in Calcutta. But the actual establishment of the Academy has more the appearance of a happy accident than of a deliberate act of policy. The Rev. J. Marsh, M.A., had come out to Ceylon as classical and mathematical tutor to the Cotta Christian institution under the Church Missionary Society. He had, however, left that institution and had come to Colombo, where he acted as Colonial Chaplain at St. Paul's Church, and in 1835 started a private school for the sons of the upper classes among the Ceylonese. The school met a want that had been felt for some time, and the leading Ceylonese residents at

* First Grade College affiliated to Calcutta University.

HIGH PRIEST SRI SUMANGALA

INSTRUCTING A CLASS IN THE ORIENTAL COLLEGE, COLOMBO.

Photo by Skeen & Co.

once petitioned the Governor, Sir R. Wilmot Horton, to support it. The decision of Government was prompt and was carried out with considerable liberality. In January, 1836, the new school became a Government institution under the title of the Colombo Academy, with the Rev. J. Marsh as its Principal.

The experiment was watched and aided with the warmest personal interest by Sir Wilmot Horton and his immediate successor, the Right Hon. J. A. Stewart Mackenzie, who on one occasion personally conducted the school examination. The object of the school was to give to those that could afford it a good education in English, Classics, Mathematics, and Religious Knowledge. No very advanced work was done, but the teaching was sound and thorough as far as it went, and the effect on the students was certainly good. Many of them rose rapidly to high positions in the service of Government. The main cause of the success of the school was the high personal character of its first Principal, the Rev. J. Marsh, a remarkable man who had in a very marked degree the gift of rousing and maintaining noble aims among those who worked under him.

The policy into which after forty years of inaction Government tumbled in this somewhat accidental fashion has much to be said for it. In the order of natural development the higher education of the few has usually preceded the elementary education of the many; and if a new education is to be artificially introduced, the best course, perhaps, is to begin by training a small section of the population very carefully under the best personal influences that can be brought to bear upon them.

The new interest of Government in education did not long remain confined to the Colombo Academy. Since the year 1834 such Government schools as existed had been under the supervision of a Commission, consisting mainly of clergy, with the Archdeacon of Colombo as its President. In 1841 this Commission was reconstituted under the title of the Central School Commission; the majority of its members were now laymen, its Secretary was a Government official, and an Inspector of Schools was appointed. Ceylon owes a great deal to this new Board, which directed education for over a quarter of a century. The most valuable part of its work was the organization of Government English schools in all the more important towns. The teaching in them, though organized on what would now be considered old-fashioned lines, was sound and efficient as far as it went, and the men educated in them have formed a useful class in the Colony. A considerable sum of money was also expended in the way

of grants to those Mission schools which conformed to the rules made by the Commission for the choice of text books. Unfortunately the rules were framed in such a way that the Roman Catholics, the largest Missionary body, were unable to conform to them.

After twenty-five years it was found that the Central Commission, in spite of considerable expenditure of money, had done very little for the spread of education in rural districts. Over 80 per cent. of the population of Ceylon is a rural population. In 1865 a Special Commission of Inquiry was appointed: its report led to the abolition of the Central Commission and the establishment of a Department of Public Instruction under one official, the Director, responsible only to the Governor.

This step was taken in 1869, the first Director being Mr. J. S. Laurie, who was succeeded almost immediately by Mr. W. H. Sendall, now Sir Walter Sendall, G.C.M.G. Sir Walter Sendall, who was not only a distinguished scholar, but had had several years' experience as an Inspector of Schools in Ceylon, must be regarded as the originator of all the best work that has been done in Government elementary schools. He started from the first principle, that if education is to be of real value it must be given by those who have been properly trained for the work; in other words, it is useless to start schools unless you can provide teachers. His first step was to get Government to establish a Normal School in which men could be trained as teachers both for English and for vernacular schools. To this institution the Department owes all the best of its elementary teachers and most of its Sub-Inspectors of Schools. As teachers became available Government schools were established. In 1869 there were only 64 of them; in 1884 their number had risen to 431, with 27,677 children attending them. The new schools were in almost all cases vernacular schools in rural districts.

Unfortunately the policy which established the Normal School was not adhered to. The coffee disease brought times of trouble to Ceylon, and the revenue was in danger. Something had to be thrown overboard; the Government English schools were among the first things to go, and the Normal School soon followed. Its place was taken by two small training schools, in each of which five vernacular teachers were trained under the best Sinhalese masters available. But even for vernacular teachers these were a very poor substitute for the old Normal School; the students had no longer the sense of membership of a great institution, nor the stimulus given by contact with a highly trained staff. It

was not till the year 1902 that this serious error of policy was rectified.

The establishment of Government schools was only a small part of the work of the new Department founded in 1869. The system of grants in aid was put on to a new footing, all sectarian regulations were abolished, and, provided that a certain number of hours were devoted daily to secular work, the Mission bodies were left free to give what religious instruction they wished during the remainder. The result has been that side by side with the new Government schools there has been a much more rapid growth of aided schools. This growth has been accelerated by the fact that the non-sectarian policy of Government left it open to non-Christian bodies to enter into competition with the Christian organizations. Among the Buddhists, aided by the Theosophical Society, a centralized organization has been formed which manages a large number of schools in the Sinhalese provinces. The Tamils have no organization of this kind, but a considerable number of Sivite schools under private management have applied for and received registration.

The following table will give some idea of the progress in Government and aided schools during the last three decennial periods :—

	Government.		Aided.	
	Schools.	Scholars.	Schools.	Scholars.
1872	200	10,852	402	25,443
1882	421	26,597	832	62,842
1892	453	42,190	1,024	82,637
1902	515	59,512	1,424	129,891

These figures include all registered schools, higher as well as elementary. A few remarks will now be made on the present state of things under these two heads separately.

Elementary Education.

Two questions suggest themselves: Does it include the whole population of school-going age? Is it good of its kind?

The first of these is easily answered. The number of children of school-going age depends of course on the duration assigned to the school-going period. In Ceylon six years may perhaps be assumed as a desirable average. The Census for 1901 shows that if every child attended school for an average of six years there would be about 520,000 children at school. The total number of those

attending schools of all kinds (unregistered as well as registered) was 218,479. It would be a mistake to suppose that by subtracting these quantities we should get the number who are receiving no education at all. The fact is that many of those attending school do so for very short periods, and it is doubtful if the actual average of school life at all exceeds four years. Adopting this figure, it has been estimated that at the present time about three-fifths of the children are getting something in the way of education, and the remainder nothing. Of those who are getting nothing, the large majority are girls. But there are still some large but sparsely inhabited districts that are almost entirely destitute of schools.

Those who have read the earlier part of this chapter will have inferred that the quality of the education is of the most varied description. It may be granted at once that a large number of the unregistered schools are as bad as they can be. In Government and in aided schools the work is of a totally different description. In both there are strong inducements to efficiency. They are examined annually by Government Inspectors, and on the results of the examination depend the grant of the aided school and the prospects of the teacher in the Government school. The work in both cases is carried on in accordance with schedules which correspond closely (perhaps too closely) with those of English elementary schools. Physical education has not been neglected: drill has for some years formed a prominent part in the work of Government schools, and is now being carried on in many of the aided schools, where it is encouraged by a small grant.

The Government schools have at present one great advantage in most of the areas in which they exist: compulsory attendance is enforced by means of the Gansabhawa or village tribunal. We have already seen that the Dutch, who understood Ceylon very well, made their system a compulsory one, and in the Sinhalese districts no system is likely to be efficient which is not compulsory. In the Tamil districts compulsion is less necessary, and if a decent school is provided the children usually flock to it. In these parts of the Island the aided schools work excellently; they also form a very efficient system in those parts of the Sinhalese districts where the inhabitants are all or almost all Christians, and where some degree of compulsion can be secured by ecclesiastical authority. But in the non-Christian parts of the Sinhalese provinces the position is sometimes a difficult one, and the wants of the people seem to be better met by Government schools.

School Gardens.

No account of elementary education in Ceylon would be complete without some reference to school gardens. During the last three years an attempt, and so far a very successful attempt, has been made to make gardening a part of the work in Government vernacular schools. The system is one of the many debts which the Department owes to its late

SCHOOL GARDENING.

Director, Mr. S. M. Burrows. In each Province schools have been selected in which the conditions necessary for successful gardening are present, viz., a suitable site with sufficient land and a teacher capable of directing the work. Seeds and implements are supplied by the Department: the produce is divided between masters and boys. Special attention is given to the cultivation of vegetables, which is much neglected in many parts of the Island; and through the school gardens useful vegetables have been introduced into many districts in which they were almost unknown before. The scheme is under a Superintendent of School Gardens aided by an Assistant, both of whom travel round, visit each existing garden as often as possible, and select new schools. A stock garden has been established in Colombo; from this seeds and

plants are distributed to country schools ; in it new products from other countries are also cultivated experimentally. The scheme has received most valuable assistance from the Director of the Royal Botanic Gardens at Peradeniya and from the Revenue Officers in many of the districts in which the schools are situated. It is hoped that it will do real service to the country by giving the schoolboy something more than mere book learning, and by fitting him both in hand and eye for rural life.

Higher Education.

Something has been said with regard to the first steps taken by Government and by Mission bodies for the establishment of institutions devoted to higher education.

ST. JOSEPH'S COLLEGE, COLOMBO.

Since that date much progress has been made. In 1853 the Church of England founded, in close connection with the Cathedral, St. Thomas's College, which now has an honourable history of half a century of good work. Other Mission bodies have followed suit, and there are now four large institutions in Colombo, while Kandy, Galle, and Jaffna each have two or three colleges and high schools. The above illustration gives a partial view of the buildings of St. Joseph's, the latest of the Colombo colleges.

Government has given a great impetus to the work of these colleges by giving annually a scholarship of £200 a year for four years, with outfit allowance and free passage to and from England. The scholar is selected by an examination held in Ceylon by the Oxford and Cambridge Joint Board for Schools' Examinations, and continues his education at an English University, Medical College, or Engineering College. The career in England of some of these University Scholars forms the best proof that can be offered that a sound education is given in some of the Ceylon schools. Here are three of them :—

H. Marcus Fernando of the Royal College, Colombo, obtained University Scholarship and Gilchrist Scholarship, 1883. At University College, London: Second Medical Entrance Exhibition £60 in 1884; First Certificate and Gold Medals in Physiology (Senior Class), in Midwifery, Medicine, and Forensic Medicine; Silver Medals in Physiology Junior Class. Midwifery Junior Class, Materia Medica; Tuke Medal in Pathological Anatomy (Practical); Achinson Scholar, £60 a year for two years, 1888; Elected Fellow of University College, 1890. At the University of London: 1883, Matriculation, twenty-seventh place in Honours Division; 1884, Intermediate Science and Preliminary Science M.B. Examination with second place, First Class Honours, Zoology, Second Class Honours, Botany; 1886, Intermediate M.B. Examination, second place, First Class Honours, Physiology (Gold Medal); third place, First Class Honours, Organic Chemistry; first place, Third Class Honours, Materia Medica; B.Sc. Examination with First Class Honours in Physiology (qualified for Scholarship); 1888, M.B. Examination, second place, First Class Honours (Gold Medal) in Medicine; second place, First Class Honours (Gold Medal) Forensic Medicine; 1889, M.D. Examination (qualified for the Gold Medal).

L. de Zylva of St. Thomas's College, Colombo, obtained University Scholarship, 1893; and entered University College, London, and the London University, 1894; 1896, passed Intermediate in Arts and Preliminary Scientific, obtained Honours in Intermediate B.Sc., winning a Scholarship of £130; 1898, passed first in Order of Merit in University College Senior Examination, winning a Scholarship of £100 for Physiology; 1899, Silver Medal for Forensic Medicine and Toxicology; 1900, London B.Sc. Examination, First Class Honours; 1903, London M.B. Examination, Diploma and Gold Medal.

S. W. Dassanaike of Royal College, Colombo, obtained Gilchrist Scholarship, 1892, and went through a three years'

course at Cooper's Hill Engineering College. First year, placed first in Order of Merit, obtaining Foundation Scholarship and prizes in Geology, Chemistry, and Physics; second year, placed First in Order of Merit, obtaining prizes in Applied Mechanics, Geology, and Physics; third year, placed First in Order of Merit in Final Examination, obtaining the Secretary of State's Scholarship for Science and prizes for Descriptive Engineering and Applied Mathematics, appointed Fellow and Associate of Cooper's Hill.

Another Gilchrist Scholar, R. H. Aserappa, did equally brilliantly at Cooper's Hill, taking the first place in all the College Examinations.

Two of the University Scholars have remained in England, two have obtained posts in the Indian Public Works Department; the rest have returned to Ceylon, and most of them are occupying honourable positions at the Bar, in the Medical profession, and in the service of Government.

In their out-of-school life the Colleges have attempted with some success to follow the model of English public schools. Cricket is played with enthusiasm, and some of the school teams can hold their own against the best English clubs. Football and athletic sports are being generally introduced. A very promising Cadet Battalion was organized in 1902 by the late Director of Public Instruction, Mr. S. M. Burrows. It consists of six companies, one from each of six of the leading schools, and acquitted itself most creditably in last year's Volunteer Camp of Exercise.

While the best of the secondary schools are certainly good, it must be acknowledged that there are many so-called English High Schools which reach a depth of badness not easy to describe. English education is popular, and its popularity has led to over-competition among the various bodies which are managing schools. The growth of English schools has been too rapid, and the supply of qualified teachers has not kept pace with it. The salaries offered in the large majority of cases have not been sufficient to tempt young men of ability to enter the teaching profession; and there has been no institution for training teachers for English schools. The result is that in a large number of the 159 English schools much of the instruction is given by persons who are not properly qualified for such work. It must be remembered that English is really a foreign language to the large majority of the pupils and to many of the teachers.

This serious state of things Government is now attempting to remedy by the establishment of a Training College for English teachers, which was opened in January, 1903. A highly qualified principal was obtained from one of the best

CEYLON VOLUNTEER CADET BATTALION IN THE ROYAL COLLEGE GROUNDS.

Photo by Skeen & Co.

English Training Colleges, and a liberal allowance is given by Government to twelve students during their period of training. Very good work has been done by the first set of students, and there is every ground for hoping that the influence of the Training College will produce a gradual improvement in the work of English schools and the ideals of teachers throughout the country.

Technical Instruction.

TECHNICAL COLLEGE.

The following is extracted from the "Ceylon Manual" for 1904:—

The College was first established in 1893, and was housed in temporary buildings in Colombo in a central position near the Railway Terminus. It was opened in October, 1893, with about twenty-five students, who were selected by an entrance examination and nominated by the Governor, and who paid fees at the rate of Rs. 50 per annum. The training offered was in Engineering, and the course was two years. At the beginning of 1894 further admissions were made, and the first course finished with an attendance of about fifty students, who had served most of the two years. A workshop, experimental laboratory, lecture room, drawing school, and a class room formed the College. About Rs. 10,000 was spent in equipment and about Rs. 2,000 in adapting the old buildings and premises (formerly a coffee store and barbecue) for the purpose. The staff consisted of a Superintendent and two Assistant Instructors, with two foremen in the workshop, a carpenter, and a fitter.

After that first tentative course it was decided that the scope of the College should be extended, and that it should be made the training ground for the Government Departments requiring recruits with technical skill. In 1896 the College was formed of four departments: Civil Engineering, Surveying and Levelling, Telegraphy, and Electrical Engineering and Mechanical Engineering. Further temporary accommodation was provided at the same premises and additional equipment was installed, and the staff was increased by three more Instructors. The additional buildings cost about Rs. 3,000 and the equipment cost about Rs. 30,000.

In 1901 a fifth department was added, viz., a Department of Drawing and Art, and again temporary accommodation was provided. The building accommodation cost about Rs. 1,100 and the equipment about Rs. 1,500. An Instructor was appointed in the same year.

At present the College consists of the five departments named above, and about 200 students are on the rolls. The staff consists of a Superintendent, three European and four Ceylonese Instructors, a clerk and storekeeper, and two workshop foremen, with other persons in subordinate posts. Permanent buildings on a large scale are now in course of erection.

Outside the Technical College there is not much in the way of technical education in Ceylon. It must be remembered that more than 80 per cent. of the population is rural: it is

hoped that the scheme for school gardens will do something towards supplying such technical education as is required by this section of the population. The Code provides a grant for industrial schools in return for instruction in the following trades:—Boys' schools: carpentry, blacksmiths' work, printing, bookbinding, tailoring, spinning; Girls' schools: lace-making, embroidery, dressmaking, cookery. There are at present 32 of these schools managed by Mission bodies. The most extensive of them is the Maggona Certified Industrial School, under the Roman Catholics. This is utilized as a Reformatory under the Juvenile Offenders' Ordinance of 1886. An allowance is made by Government for each juvenile offender, and considerable building grants have been given. Each trade is supervised by one or more trained Brothers, and the institution is a model one of its kind.

Ceylon Medical College.

This important institution is not connected with the Department of Public Instruction, but is under its own Council, of which the Governor is President, and is carried on in accordance with the Medical Acts of Great Britain and the Regulations of the General Medical Council of Great Britain. It was established in 1870 as a Medical School in connection with the Colombo General Hospital. In 1887 the Privy Council of Great Britain determined that the second part of the Medical Act of 1886 shall be deemed to apply to Ceylon, and in 1888 the license of the Ceylon Medical College in Medicine and Surgery was recognized by the General Medical Council of Great Britain. Great improvements have recently been made in the equipment of the College.

The students of the College go through a five years' course, taking up their first professional examination at the end of the first year, their second professional examination at the end of the third year, and the final examination in two parts at the end of the fourth and fifth years.

Lady students were admitted to the College in 1892; they have a separate building with a special dissecting room.

Besides the Medical Department the College contains an Apothecaries' Department in which Apothecary Students go through a two years' course.

COLOMBO HARBOUR.

CHAPTER IV.

TRADE WITH THE UNITED STATES.*

BY

FRANCIS CROSBIE ROLES, F.J.I., F.R.C.I., Editor of the "Times of Ceylon," and Official Visitor to the Ceylon Court.

IN the early fifties of last century one or two ice ships came to Colombo from Boston, and brought, besides ice, apples, butter, cheese, hams, salt beef, pork, and fish; but at that time (and until 1881) Galle was the chief port of the Island. Consequently the owners, the Tudor Company, established a depôt there, which was maintained until 1869 or 1870, when manufactured ice came into vogue. In the year the visits of American ice ships ceased American kerosine oil began to arrive, but, coming from Bombay, it was scheduled at the Customs among imports from India. Direct imports from the United States began nine years later, in 1879; but during the last decade of the century Russian petroleum, shipped in case and in bulk, came into general use at a lower price, and largely superseded the American product and competed with the native illuminant, cocoanut oil. American oil continues to arrive either in sailing vessels or in part cargoes by steamers bound for other ports; and in 1902 its value was Rs. 295,844. Mr. W. Morey, the United States Consul in Ceylon, estimates the total value of American kerosine imported during the past thirty-four years from Bombay at Rs. 1,000,000 and from the United States direct at

* Rs. 3 = $ 1.

Rs. 3,500,000. Kerosine oil was not kept separately in the Customs returns prior to 1883.

Prior to 1897, while some tea and desiccated cocoanut went by steamer *viâ* London, the bulk of the exports to the United States, consisting mainly of plumbago, cocoanut oil, and citronella oil, was carried by sailing vessels, the majority of which completed their loading on the Malabar Coast with the lighter cargo obtainable there. Several of these ships flew the American flag, and in 1882 four American sailing ships arrived, three of which loaded for New York: "a most unprecedented occurrence in our commercial annals," was the Consul's comment in his report for that year. The last American sailing vessel to load in Colombo for New York was the "Lottie Moore," which sailed in October, 1897. Meanwhile the trade was gradually evolving itself from sailing ship to steamer communication, and, beginning with the ss. "Aladdin" on 19th June, 1897, Messrs. Barber & Co. of New York attempted to start a series of direct shipments to that port, and up to March, 1898, a number of their chartered steamers called at Colombo at irregular intervals on their way from China and took a fair amount of cargo, consisting chiefly of plumbago and cocoanut oil. It was found difficult, however, for steamers coming from China to reserve the bottom space required for this heavy cargo, and the inauguration in 1898 of regular direct sailings by the Bucknall Line—trading between Calcutta and New York, and bringing rice from Calcutta to Colombo—gave the desired opportunity for the development of the trade. Since 1902 the service has been carried on jointly by Messrs. Bucknall Brothers and the Hansa Line of Bremen. Originally the steamers proceeded to New York direct, but a large number now make Boston the first port of call, and although there is not much Ceylon cargo actually destined for this port, quicker despatch and lower rates of freight are thus secured for cargo for Canada and the more northerly points in the United States. The length of passage varies, but about forty days may be taken as a fair average from Colombo to America. Through bills of lading are given to all the principal points in the United States, Canada, Mexico, the West Indies, and towns in South America, a convenience which is largely availed of, especially by tea shippers. The feature of the trade in 1903 was the large increase in tea shipments, especially of green tea. The following are the current rates of freight to New York and Boston:—Citronella and other essential oils, 50*s*. per ton (Ceylon scale 50 cubic feet); tea, 33*s*. per ton; plumbago, cocoanut oil, desiccated cocoanut, &c., 30*s*. per ton, subject to a rebate of 10 per

NATIVE LIFE IN COLOMBO.

Photo by the Colombo Apothecaries' Company.

cent. to those shippers who contract to forward all their cargo by the line, the contracts being for yearly periods.

The following paragraph reviewing the Island's trade in 1899 is extracted from Sir West Ridgeway's Annual Address to the Legislative Council in opening the session for 1900-1 :—

"A striking development occurred in the direct export trade with the United States of America, the total value of Ceylon produce so exported rising from 52 lacs in 1898 to 136 lacs in 1899, a consequence, largely, of the increased value of plumbago (for which there is a large market in New York), though trade generally is no doubt fostered by the direct and regular steamer service now established between Ceylon and the States."

The return traffic from the States to Ceylon is not by direct steamers at present. Goods for Ceylon arrive *viâ* London, Liverpool, or Bombay from the Atlantic ports, and *viâ* Hongkong from the Pacific coast. When the growth of American imports ensures direct shipments orders will increase still more, owing to the time saved compared with present arrangements.

Many articles, both ways, are handled in Europe and are not credited to the country of origin ; but the following are the official figures standing for direct interchange for two years only a decade apart :—

	1892. Rs.		1902. Rs.
Exports to the United States ...	5,496,061	...	9,987,008
Imports from the United States...	230,094	...	725,527

which compare with the total overseas trade of the Island exclusive of specie as follows :—

	1892. Rs.		1902. Rs.
Total Exports	61,095,885	...	110,731,670*
Total Imports	62,761,949	...	97,883,263

* Includes value of coal supplied to steamers, amounting to Rs. 12,497,280.

Exports.

For upwards of eleven years, beginning with the decision to have a fine display at the Chicago World's Fair of 1893, the **Tea** planters of Ceylon, aided by the Government, which provides almost all the outlay in connection with International Expositions, have made a persistent and remarkable effort to exploit the United States market. At the close of the Chicago Exposition a permanent Commissioner was

appointed; and year after year an executive body called the Thirty Committee, elected by the Planters' Association of Ceylon and the Ceylon Chamber of Commerce, has expended $50,000 per annum in advertising and demonstrating in North America, besides carrying on a propaganda in other countries. When the Spanish war tax of 10 cents (*5d.*) was placed upon tea imported into the United States, while coffee continued a free import and also fell in price, so severe a blow was dealt to the prospects of tea consumption in the United States that Ceylon would possibly have decided not to participate at St. Louis if its removal—it was the last of the

TEA FACTORY: COOLIES CARRYING TEA CHESTS.

customs war duties to disappear—had not been decided upon. Indeed, had not Canada at that time become a keen customer, the entire campaign in North America might have been abandoned four years ago. The money for the exploitation of Ceylon's staple export was provided for the first few years from a voluntary tea fund, but since 1892 from a cess collected at the Customs on all teas exported. This cess began at 10 rupee-cents for every 100 lb., and was twice increased, until 30 cents per 100 lb. was reached. This has enabled the executive body to encourage the new industry of green-tea, which during the past three years has made notable progress. A

bonus is paid on every pound of green tea up to certain standards. Ten rupee-cents per lb. was the rate offered for some time, but it was reduced as the quantity increased, and it is at present 3 cents per lb., and is to cease altogether about the middle of 1904. The new industry served to reduce the black tea export in 1903 by 11,200,000 lb., and relieved the London market to nearly that extent from the depression of over-production, which until then had remained at an acute stage since the end of 1900. An illustration of the development in direct tea shipments in the past six years is afforded by a comparison of the largest quantities shipped in 1897–8 and in 1903 respectively. In November, 1897, the "St. Ninian" took 152,698 lb. of black tea, of which 89,851 lb. were for the United States and the rest for Canada; and in July, 1903, the "Schonfels" took 422,611 lb. black and 527,772 lb. green tea for North America. The tea section of Ceylon's trade with America merits this detailed reference, for it is part of a remarkable chapter in tropical agriculture and enterprise ; and while the St. Louis Exposition marks the culminating point in this organized propaganda, it also possesses a new feature of great promise. Never before at any International Exposition has Ceylon green tea been served in the cup side by side with black.

Cocoa (cacao), which was started in Ceylon a quarter of a century ago, now stands third in the list of agricultural exports, preceded by tea and the products of the cocoanut palm. It is thus an important additional string to the planter's bow. The total export for 1902 was 60,455 cwt., valued at Rs. 2,500,000. There is practically no direct shipment to the United States ; but cocoa is to be sold in cup at the Ceylon Court, in addition to green and black tea—also for the first time at any International Exposition—and direct trade in the article, which takes high rank in the United Kingdom, should result.

To foster trade in other products a Commercial Samples Room has been provided within the Ceylon Court, and should be visited by business men. Here are specimens of all our chief low-country exports which find mention from the economic point of view in other sections of this book.

Plumbago (graphite) is entitled to special mention, and will take a prominent place, both in the Samples Room and in the Mines and Metallurgy Building, because the United States has been for many years the largest purchaser of Ceylon's one commercial mineral. The different grades are L L (large lump), O L (ordinary lump), chips, dust, and flying dust. With the small exception of Travancore in Southern India, Ceylon is the only source of supply of

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plumbago as an article of commerce. In 1899 the demand for plumbago exceeded the supply, with the result that a local boom took place and prices rose to a high point. Since then more normal conditions have obtained, but there is no indication that prices will ever return to the level of ten years ago. At the beginning of 1903 two American plumbago mine companies invited the New York investing public to purchase their bonds. One company said that whereas the Ceylon supply was diminishing, its own mines could supply the world's demands for a century. It declared that it would pay 25 per cent., and could demonstrate by correspondence on file that it could not only undersell Ceylon in the United States, but in all the markets of the world. The prospectus of the other, which had a Broadway address and truly remarkable deposits in Canada, reached its highest geographical flight in speaking of "the famous graphite deposit at Travancore in the Island of Ceylon." This display of ignorance could not reduce the value of any unwon plumbago in North America; but justifies scepticism regarding the expert knowledge upon which all the other assertions were alleged to be based. Both companies should have plenty of scrip going cheap; and Ceylon continues to hope that in these practical days those who want the very best plumbago will continue to purchase it instead of bonds, which would make a poor substitute. There is an abundance of amorphous or granulated plumbago even in the United States, but it has practically no commercial value. The foliated or flaked graphite is what is called for; and Ceylon continues to supply the world's demands, as confident as ever that its stock is exhaustless. So widely distributed are the plumbago deposits in Ceylon that the idea of including this article in the map in this Handbook representing locality and area of our principal products was abandoned.

Of the products of the **Cocoanut palm**, desiccated cocoanut —a young but flourishing development, the market grades of which are chips, strips, fine, medium, and coarse—has been taken by America in recent years in large quantities, chiefly for confectionery; cocoanut oil, used among other things by soap makers, continues a most important item; but in copra, coir fibre, and coir yarn Ceylon has hitherto failed to successfully compete with the Malabar Coast. There may be possibilities of expansion, however, in these and in other articles. The samples of coir ropes from ¾ inch in circumference to 12 inches—the first quality coir is used in the sizes up to 7 inches—should serve to establish that for use where the strain is not abnormal no other cheap rope so well resists rotting from wet; mattress and bristle fibres, for

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padding and brushes respectively, might be drawn from Ceylon in large quantities; and poonac (cocoanut cake) should be worth shipping at our medium low rates for freight.

Before Ceylon tea secured a foothold there was, besides plumbago and cocoanut oil, a third product for which the American demand was large. As with the other two, the United States continues to this day a large purchaser of **Citronella oil.** The production of the oil is a rural industry; and the demand for the product unfortunately led to heavy adulteration, chiefly by means of petroleum. This has

PADDA BOATS IN DUTCH CANAL.

continued for several years; and even Schimmel's test has proved insufficient to stop the malpractice and rehabilitate this important Ceylon industry. At the time of writing, however, Mr. M. Kelway Bamber, F.I.C., F.C.S., M.R.A.C., M.R.A.S.E., &c., Government Chemist, has discovered a perfect and speedy test which will be promptly adopted by the European exporting firms, and possibly by the Government, to effectually stop a practice which has not only depressed prices, but has driven some of the best customers away to

Java. 1904 is to witness the restoration of the good name of the Island in the citronella oil trade.*

Cardamoms are to be especially exploited with "folders" and with samples for distribution. An increased demand for this aromatic "Seed of Paradise" is necessary; and it is hoped that America, besides having it on sale in its drug stores, will take larger quantities for culinary purposes, thus following an excellent precedent in **Cinnamon** bark and chips, required for flavouring and the extraction of oil. This bark is rolled into quills of four grades, the smallest quills being the best; and what is termed in the trade "ordinary assortment" means that in every 100-lb. bale there shall be 20 lb. of No. 1, 50 lb. of No. 2, 26 lb. of No. 3, and 4 lb. of No. 4. The nut of the Areca palm makes a good astringent and tooth powder, and the fibre of the genuine Jaffna Palmyra palm is not rivalled for toughness by the Palmyra fibres of India. The long fibre of the Kitul palm merits increased attention, but at present the palm chiefly grows wild. There are four sizes of fibre, and the proportions usual to every ton are as follows: No. 0 size, 1 cwt.; No. 1, 9 cwt.; No. 2, 9 cwt.; No. 3, 1 cwt. Of minor products, such as Vanilla, Sapanwood, Myrobolans, Croton seed, and Gingelly seed (for the oil and poonac), the Colony cannot expect a larger turnover until its inhabitants attempt to grow these valuable articles on a sufficiently large scale; but samples are on view, and the United States will hear more of some of them in years to come.

*The following is a brief description of Mr. Bamber's important discovery for detecting and estimating the amount of adulteration in citronella oils, whether of mineral or fatty oils:—A special graduated glass tube is employed with a capacity of about 25 cubic centimetres, the lower portion being constricted and graduated to a tenth of a cubic centimetre to allow of more accurate readings. Two cubic centimetres of pure acid-free cocoanut oil are measured into the tube from a burette and then 2 cubic centimetres of the citronella oil to be tested, the two oils being mixed by agitation. Twenty cubic centimetres of 83 per cent. alcohol are then added, the tube closed with a stopper, and agitated violently for one minute. The tube is then placed in a Leffman Beam or other suitable centrifugal apparatus properly counterbalanced, and centrifugalized for about one minute, when it is removed, and the volume of oil in the lower part of the tube read off. Deducting from this the 2 cubic centimetres of cocoanut oil originally added, the difference, if any, will represent the amount of adulteration in the 2 cubic centimetres of citronella oil tested, from which the percentage is easily calculated. The test agrees with Schimmel's to a certain extent; but is far more delicate and will estimate an adulteration of 1 or 2 per cent. It is also more easily carried out, especially in tropical countries, as cooling for several hours to detect the minute drops of oil is not required. In temperate climates, however, the estimation would have to be conducted at about 30° Centigrade to maintain the cocoanut oil in a fluid state, or another suitable fatty oil fluid at low temperature be employed.

Rubber is the latest "new product" in Ceylon; and many thousands of acres have been and are to be planted, almost entirely with the Para variety. Extensions on all sides are following upon the extremely favourable reports and high prices secured by the latex extracted during 1903 from trees planted by pioneers in this promising industry. In the middle of the year an amusing but valuable testimonial was secured by the New York Customs attempting to charge duty as for the manufactured article on some Ceylon rubber forwarded *viâ* London, so pure and attractive was its appearance. In our Customs exports to the United States rubber and rubber seed appear for the first time in the year just closed. The samples of biscuit and scrap exhibited should attract much attention, for with rubber, as with other things, America is daily finding new uses and inventing new processes.

Curios, precious stones, and jewellery hardly appear in the export figures. They are carried away by numerous visitors; but such establishments as A. A. Vantine & Co. and Tiffany may before long do an increased business direct.

Imports.

In 1892 70,785 cases of kerosine oil, of the value of Rs. 230,051, were credited to the United States, and of eight other items the largest was Rs. 13 for wearing apparel. For 1893, the year of the Chicago World's Fair, the only items were four packages of perfumery (Rs. 370) and Rs. 10 worth of pottery. This is a contrast to the present volume of American supplies!

Of American goods now obtainable in Ceylon, the following articles have been named by leading stores in response to inquiries:—Bacon and hams; beer; bells; bicycles; boots and shoes; builders' hardware; cash registers and other automatic machines; clocks and watches; Californian fruits; drugs and patent medicines; files and other tools; furniture; general brassfoundry; guns, rifles, and revolvers; harness; horse scrapers for earth excavation (used with bullocks in Ceylon); hydraulic rams and pumps; incubators; lamps; lard, dripping, &c.; lawn mowers; locks; refrigerators; machine belting; safes; steam and water service fittings; sewing machines; tinned beef and other meats; typewriters; weighing machines. Of recent years the demand for the majority of these articles has consistently expanded, particularly for patent medicines, which are generally more agreeable to the taste than English ones; boots and shoes (called in the United States high shoes and

low); clocks and watches; locks, pumps, and weighing machines. Detailed information on all points will be found in the up-to-date Customs statistics appended to this article. For some years Colombo has possessed a well-worked electric trolley car system (*Anglice* tramways), and the whole of the equipment for the cars and the generators came from America. There are also four "Locomobile" steam motor cars in Ceylon.

In the absence of any direct service from Atlantic ports American goods are greatly delayed in transit, whether the transhipment takes place at European ports or at Bombay.

VILLAGE BOUTIQUE.

One firm complains that for mail orders five months in all will probably elapse before delivery is obtained, against ten weeks for similar goods when ordered from England; and states that if direct freight could be got the other way it would lead to a considerable increase in American imports. It should be possible, however, by concerted action between consignors and consignees, aided by their respective Chambers of Commerce, to improve the present state of things. The Atlantic service is unrivalled; and Colombo is excellently

served by half a dozen steamer lines. Closer connections between the two should not be beyond the wit of men of affairs.

With new tropical possessions, the United States is studying more than before the requirements of tropical countries; and while the total purchasing power of the inhabitants of Ceylon is very small when compared with that of the population of the State of Missouri, which now possesses nearly the same, three and a half millions, the annual growth of the Island's imports indicates an increased demand of great future promise, corresponding with the expanding wealth and requirements of the residents of all the chief towns, irrespective of nationality.

Parcels Post.—Banking Facilities.

The parcels post is useful in initiating new business; but as the United States depends upon the American Express Company, the service is less satisfactory and more expensive than a State parcels post. The arrangement made between the American and the British Postmasters-General was inaugurated on the 1st September, 1902, and the Ceylon Post Office took advantage of it from the 1st November, 1902; but the parcels have been very few either way. An illustration of the drawbacks of a one-sided system came within the experience of the writer. A year ago a parcel was forwarded from Ceylon, accompanied by the announcement that a parcel post service had been established between the two countries; but when the recipient in America attempted to despatch a parcel in return it was refused at the post office at which it was tendered, and many weeks elapsed before the misunderstanding was cleared up. Mr. J. Henniker-Heaton, M.P., the English postal reformer, has recently urged the importance of adding this department to the United States Post Office, and negotiations for an official service have been reopened. A most valuable addition to this would be the extension of the C.O.D. system for international purposes. The British Isles lag behind in this matter; but the same facility has for many years existed in Ceylon, and between Ceylon and India, under the designation V.P.P. (value-payable parcel), and is much appreciated.

There are the usual banking facilities. The Hongkong and Shanghai Banking Corporation and the Chartered Bank of India, Australia, and China have branches both at Colombo and New York; and the International Banking Corporation of New York has agents in Colombo. Colombo has five banks in all (some of them having branches in

Galle, Kandy, and Nuwara Eliya), and reference can always be made to one of them regarding the status of any firm desiring goods for sale on commission; or to the Secretary of the Ceylon Chamber of Commerce. Yet there are instances on record where goods sent and the proceeds have been absolutely irrecoverable, and the name of a Eurasian who came to Ceylon from India has had the distinction of being "posted" in the Philadelphia Commercial Museum. The European business houses are almost entirely situated in the Fort of Colombo, but in the Pettah are a considerable number of native firms of standing; and the attention paid to them by commercial travellers is often well rewarded.

A fixed exchange of fifteen rupees to the pound sterling has removed serious complications in money matters. It is as easy for an American to multiply his (gold) dollars by three to learn the number of rupees as it is to divide by five to arrive at the number of sovereigns; and indeed to others familiar with American currency the dollar supplies an easy connecting link in mentally changing rupees into their English equivalent, and *vice versâ*.

Customs Figures of the Trade.

The following are the articles sent direct to and received from the United States for the years 1901, 1902, and 1903; and values are added to quantities to afford information regarding fluctuations in price. Details regarding trade with other countries can be obtained at the Ceylon Court:—

Exports.

(Solely the Produce and Manufactures of the Island.)

Quantity.					Value.		
1901.	1902.	1903.			1901.	1902.	1903.
					Rs.	Rs.	Rs.
31	—	—	cwt.	Bêche-de-mer	1100	—	—
1821	247	1082	cwt.	Cacao	89047	10196	11945
155	75	27	cwt.	Cardamoms	26435	10289	4150
25389	3313	120	lb.	Cinchona bark	2539	298	8
3722* 200†	4208* 216†	4807* 1217†	cwt.	Cinnamon	237202	282428	303609

* Quills. † Chips.

Exports—continued.

Quantity. 1901.	1902.	1903.			Value. 1901.	1902.	1903.
					Rs.	Rs.	Rs.
800	—	—	oz.	Cinnamon oil	780	—	—
4267255	9522778	9110464	oz.	Citronella oil	218643	341436	392352
—	—	25	lb.	Cloves & mace	—	—	50
—	73110	10010	nos.	Cocoanuts	—	3436	500
8974	20634	17168	cwt.	Do. desiccated	166480	407539	330438
27122	96491	105809	cwt.	Cocoanut oil	434766	1751311	1696118
20	—	—	cwt.	Cocoanut leaf quills	150	—	—
3317	6072	8057	cwt.	Coir fibre	18907	38739	48342
622	1934	1055	cwt.	Coir yarn	6786	19823	11077
—	—	73	lb.	Coir, other	—	—	100
1	—	—	cwt.	Copra	10	—	—
129	729	41	cwt.	Coffee	7761	45016	2343
8065	67282	5686	lb.	Cotton	1817	18571	1965
145	21	—	cwt.	Croton seed	4638	300	—
8	18	33	pkgs.	Curios & fancy articles	1323	4230	3096
—	—	34	lb.	Curry stuff	—	—	15
—	—	1	pkgs.	Drugs, manufactured	—	—	300
15	19	—	tons	Ebony timber	3114	2572	—
—	—	12	pkgs.	Furniture	—	—	924
1968	1836	3061	cwt.	Manure	10972	10590	16480
—	—	204	cwt.	Manufactured articles, unenumerated	—	—	16626
pkg. 1	—	50	nos.	Natural history specns.	30	—	100
—	—	20	lb.	Nutmegs	—	—	35
—	—	21	cwt.	Nux vomica	—	—	112
60	—	168	cwt.	Palmyra fibre	800	—	2220
—	2	1	pkgs.	Pearls & precious stones	—	5330	2525
—	—	2	cwt.	Pepper	—	—	175
—	—	4	pkgs.	Plants & roots	—	—	315
173000	272219	237143	cwt.	Plumbago	3719500	5682572	2964287
—	—	3	cwt.	Rubber	—	—	1400
—	—	46	cwt.	Seeds, rubber	—	—	2250
—	—	3	cwt.	Do. other	—	—	150
—	—	2	cwt.	Skins, dressed	—	—	760
1167919* 360374†	2465503‡ 1264303§	3403566‡ 3522444§	lb.	Tea	504337	1342730	2701144
3	2	—	cwt.	Tea seed	550	400	—

* Black. † Green.

Imports.

Quantity.				Value.		
1901.	1902.	1903.		1901.	1902.	1903.
				Rs.	Rs.	Rs.
*	—	—	cwt. Aluminium ware	2	—	—
—	16	9	cwt. Bacon	—	1177	807
5	—	—	cwt. Beans	60	—	—
28	132	84	cwt. Beef, salted	1083	4054	2482
4200	8546	18582	lb. Do. tinned	1173	4071	5968
440	1283	546	gals. Beer and ale, bottled	891	3278	770
22	—	144	lb. Biscuits (U.S. crackers)	19	—	43
1310	—	—	nos. Blankets	1699	—	—
—	*	—	cwt. Bleaching materials	—	14	—
12	2	215	nos. Books	3	12	397
348	425	282	pairs Boots and shoes	2228	2155	1775
—	1	—	cwt. Brassware	—	162	—
5851	—	72	nos. Bricks and tiles	925	—	59
25	300	12	nos. Brooms and brushes	12	207	8
—	9	—	lb. Butter, tinned	—	9	—
8	—	—	gross Cards, playing	301	—	—
7	2	5	nos. Carriages and carts	2290	658	1334
—	1500	3750	nos. Caps, percussion	—	4	29
500	35600	119500	nos. Cartridges	21	1190	2138
*	*	—	cwt. Cheese	44	90	—
98	43	81	cwt. Chemists' sundries	13579	4952	11016
*	—	—	cwt. Chinaware	30	—	—
248	631	995	nos. Clocks	1310	3446	6780
—	86	342	lb. Confectionery	—	76	471
*	—	—	cwt. Copperware	6	—	—
315017	625900	459400	yds. Cotton, piece goods, gray	60592	118810	82999
—	36720	—	yds. Do. bleached	—	6790	—
14089	—	—	yds. Do. printed	2566	—	—
6480	—	—	yds. Do. other	3702	—	—
—	20	22	cwt. Do. waste	—	517	486
—	—	2	cases Do. thread	—	—	77
—	1	—	pkgs. Drawing materials	—	27	—
—	1	5000	pcs. Earthenware	—	314	85

* Less than 1 cwt.

Imports—continued.

Quantity.				Value.		
1901.	1902.	1903.		1901.	1902.	1903.
				Rs.	Rs.	Rs.
214	92	66	cwt. Electric materials	34788	10197	7109
36	—	15	nos. Electroplate	271	—	5
2	9	18	cases Fancy articles	96	504	3067
32651	25564	37769	lb. Fish, tinned	11177	8056	8258
9910	—	—	yds. Flannel	2360	—	—
2309	1977	1815	cwt. Flour, wheat	16330	12403	12001
32	95	707	cwt. Food and drink unenumerated	1378	4229	24010
1	19	—	cwt. Fruit, apples, and other fresh fruit	25	903	—
1	*	*	cwt. Do. raisins, preserved	61	24	1
—	*	—	cwt. Do. currants, preserved	—	71	—
151	98	129	cwt. Do. other, preserved	3956	5332	7415
126	324	198	pcs. Furniture	1038	1280	1652
100	7	1308	cwt. Galvanized iron	1111	82	11692
101	1	2	cwt. Glass, other	413	166	86
539	1023	1053	nos. Govt. stores	7701	36184	41160
12	62	66	nos. Guns, single-barrelled	190	1083	1190
—	10	33	nos. Do. double-barrelled	—	513	2062
—	110	188	nos. Do. accessories	—	171	1086
2	—	—	pkgs. Haberdashery	130	—	—
—	40	27	cwt. Hams	—	2355	1723
440	385	464	cwt. Hardware	16117	17849	16486
1	1	1	case Harness and saddlery	16	213	70
236	619	170	nos. Lamps	1403	570	529
1	2	*	cwt. Leather, dressed	147	238	160
—	1	1	cases Leather, other	—	81	26
—	1	—	nos. Locomotives, excluding railway	—	3284	—
1	18	—	cwt. Machinery, dutiable	236	444	—
234	237	932	cwt. Do. free	18520	23299	68425
—	—	517	cwt. Manures, blood meat	—	—	3741

* Less than 1 cwt.

Imports—continued.

Quantity.				Value.		
1901.	1902.	1903.		1901.	1902.	1903.
				Rs.	Rs.	Rs.
—	—	15	nos. Maps	—	—	46
35	210	—	4 doz. cases Milk, preserved	401	2359	—
55	11	2	nos. Musical instruments	3681	1604	250
—	1288	720	lb. Mutton, tinned	—	408	251
—	3	—	nos. Natural history specimens	—	30	—
1180	1795	1802	cwt. Nails and rivets	10501	14505	16143
480	1240	7596	yds. Oil and floor cloth	332	849	4975
170478	469594	284195	gals. Oil, kerosine	185000	295844	179042
3997	36077	72448	gals. Do. lubricating	4208	32166	63798
200	—	50	gals. Do. turpentine	281	—	135
2792	977	57	gals. Do. other	2661	678	133
844	—	—	rms. Paper, printing	1205	—	—
—	—	1160	rms. Do. writing	—	—	2706
800	62	16	rms. Do. other	683	707	1181
*	20	8	cwt. Painters' colours	99	955	1010
12	2	3	cases Perfumery	2508	50	1470
—	—	2	cases Photographic materials	—	—	50
509	—	1	nos. Pictures	23	—	6
—	—	3	nos. Pistols	—	—	24
1	27	4	cwt. Pork, salted	84	1059	201
4	1	83	cases Printing materials	472	36	6188
—	622	626	nos. Railway carriages, trucks, and parts	—	9831	9092
—	1	—	nos. Do. engines, tenders, and parts	—	3075	—
—	8	—	cwt. Do. rails and fish plates	—	613	—
—	50	187	cwt. Do. plant and stock, other	—	1436	3224
5	—	—	cwt. Rice	50	—	—
—	39	—	cwt. Raw materials, unenumerated	—	788	—

* Less than 1 cwt.

Imports—continued.

Quantity.				Value.		
1901.	1902.	1903.		1901.	1902.	1903.
				Rs.	Rs.	Rs.
62	162	139	nos. Revolvers	489	1121	1418
—	22	153	nos. Rifles, single	—	464	2270
—	14	11	nos. Do. magazine	—	488	1243
—	—	1	nos. Scientific instruments	—	—	10
218	9	147	cwt. Sewing machines	11052	3525	4393
—	15	—	yds. Silk and satin broadstuff	—	15	—
28	20	22	cwt. Soap, toilet	3271	1703	3308
*	44	4	cwt. Do. bar	13	571	57
—	—	10	gals. Spirits, liqueur	—	—	130
—	—	19	gals. Do. whisky	—	—	200
88	134	83	cases Stationery, excluding paper	692	1705	1104
17	16	—	cwt. Steelware	597	821	—
—	—	304	cwt. Sulphate of ammonia	—	—	3001
36	31	52	cwt. Tallow and stearine	831	752	1817
548	—	1006	nos. Tea chests	859	—	1640
3	—	1	cwt. Tea machinery	248	—	186
—	4680	2177	yds. Textile, unenumerated	—	2937	1607
—	—	3	pkgs. Do. apparel made up	—	—	1494
—	—	*	cwt. Tinware	—	—	15
1074	689	1050	lb. Tobacco, cigars	4874	1374	4030
32184	57475	69224	lb. Tobacco, other	24292	39382	51744
1	5	4	cases Toys	48	724	150
25	15	6	cwt. Varnish	1963	1423	600
—	174	163	nos. Watches	—	3669	1081
—	12	—	cwt. Wheat	—	12	—
72	—	—	gals. Wines, still, Burgundy, in wood	107	—	—
—	—	349	gals. Do. other in bot.	—	—	6877
—	13	—	gals. Do. Port in bot.	—	211	—
—	4	—	gals. Do. Sherry do.	—	30	—
260	201	—	gals. Do. other in bot.	5163	4256	—
234	—	—	cwt. Miscellaneous, free	18520	—	—
160	152	168	nos. Unenumerated dutiable	7416	9657	10905
76	36	40	nos. Do., free	2879	2260	4607

* Less than 1 cwt.

KANDY LAKE, SHOWING LIBRARY AND OCTAGON.

CHAPTER V.

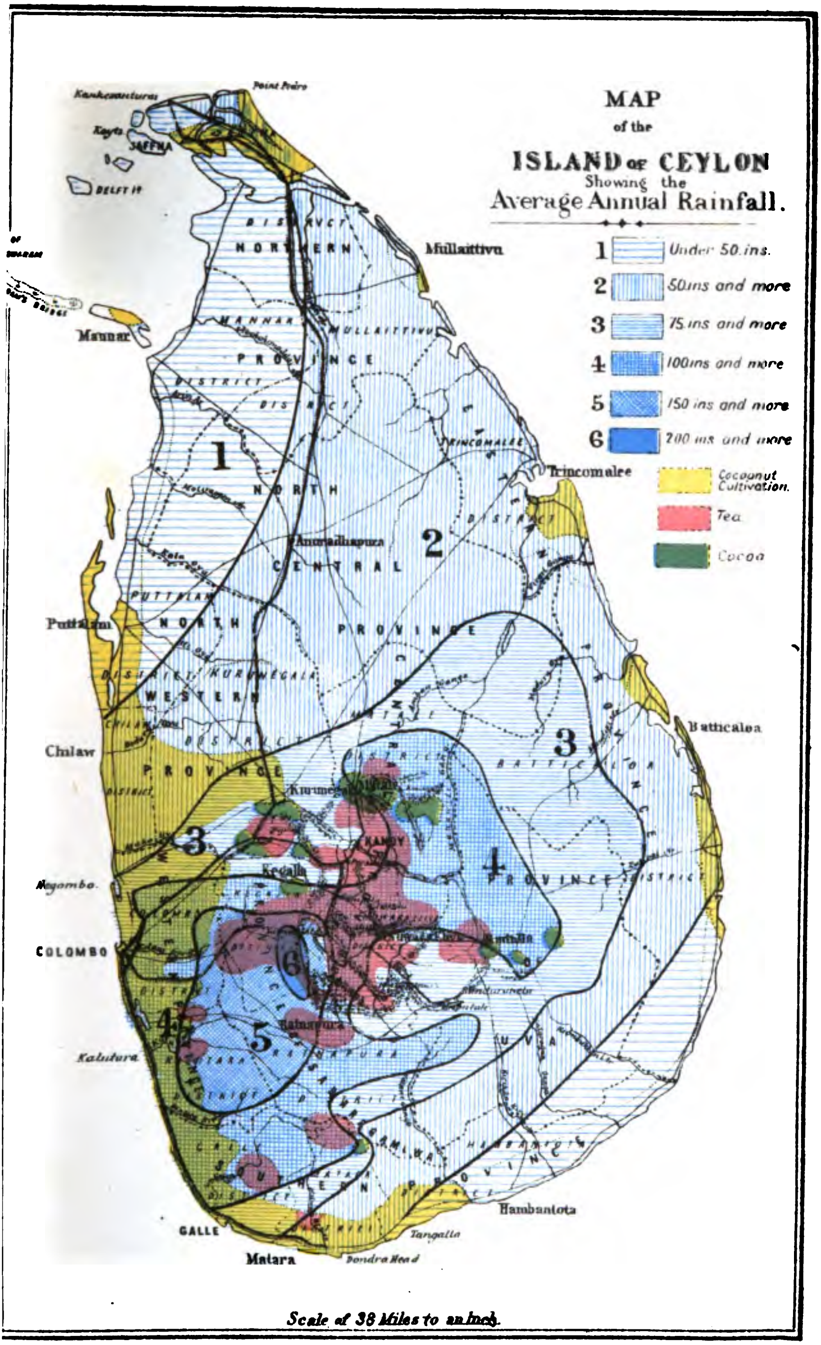
AGRICULTURE.

BY

J. C. WILLIS, M.A., F.L.S., Director of the Royal Botanic Gardens.

CEYLON, speaking broadly, is entirely dependent upon agriculture for its prosperity. Fishing, plumbago mining, gemming, and other pursuits not connected with agriculture do indeed support a number of its people, but the enormous majority are either directly engaged in the cultivation of the soil or in industrial work dependent upon agriculture, such as tea manufacture, basket weaving, oil making, carpentry, transportation of agricultural products, &c. The native inhabitants are naturally a race of tillers of the soil, living in little villages of a few hundred people. It is true that the interior contains many small towns with populations of 2,000 to 8,000, but the majority of these are in the tea districts, and their growth is due to the enterprise of European planters, which has created new industries with a great export trade.

The Sinhalese or Tamil villager, living on his ancestral lands, cultivates, as his fathers cultivated, with cheap and primitive tools, the few products necessary for his simple mode of life. On the irrigated land or "fields," as distinguished from the unirrigated or "high" land, he grows the rice or paddy which forms the staple of his food. His little hut stands on the high land, and is usually surrounded by a wilderness of trees and plants of many kinds, among


MAP
of the
ISLAND of CEYLON
Showing the
Average Annual Rainfall.
1 Under 50 ins.
2 50 ins and more
3 75 ins and more
4 100 ins and more
5 150 ins and more
6 200 ins and more
Cocoanut Cultivation.
Tea
Cocoa
Point Pedro
Kankesanturai
Kayts
JAFFNA
DELFT
Mullaittivu
Mannar
NORTHERN
PROVINCE
Trincomalee
Anuradhapura
NORTH
CENTRAL
PROVINCE
Puttalam
NORTH
WESTERN
PROVINCE
Chilaw
Batticaloa
Kurunegala
KANDY
Kegalla
Negombo.
COLOMBO
Kalutara
Ratnapura
UVA
Hambantota
GALLE
Matara
Tangalla
Dondra Head
Scale of 38 Miles to an Inch.

which the most important is the cocoanut (replaced in the dry Tamil districts by the palmyra palm), which supplies oil, fibre, thatch, food, and many of the necessaries of life, while there are also many fruit trees, such as plantains or bananas, jaks, breadfruits, mangoes, oranges, pomeloes, pomegranates, pineapples, &c., vegetables such as yams, sweet potatoes, cassava, brinjal or egg fruit, bandakai or okra, peas, beans, and other pulses, gourds and squashes, chillies, pepper, and other spices, arecanut palm and betel pepper to provide the materials of his unceasing "chew," or in some

COLLECTION OF CEYLON FRUIT.

districts a little tobacco. The composition of the wilderness varies in different districts and climates, but the general look is much the same. Careful garden cultivation, such as is seen in Europe or America, is comparatively rare in Ceylon, and is chiefly found in the dry north country among the Tamils.

The greater part of the high lands other than actual forest is occupied by "chena" cultivations or is land recovering from chena. This is a favourite practice with the villager; the

forest (or the scrub growing on land previously chenaëd) is felled and burnt, and a crop of "dry grain" (*i.e.*, cereals such as millet or maize, which do not require irrigation), pulse, gingelly, or sometimes cotton, is grown on the land. After two or three years the land is abandoned and grows up in low scrub, and ten or more years must usually elapse before it can be again chenaëd. Vast areas of good forest have been wasted in Ceylon by this destructive practice.

HIGH LANDS AND PADDY FIELDS.

The villager, especially in the more outlying districts, has but few wants that cannot be supplied by his own fields, or by the labour of himself or his women folk. Cotton fabrics for his scanty clothing, kerosine oil for his lamp where he has become too advanced for cocoanut oil, a few simple curry stuffs, such as dried Maldivian fish, a few brass and earthenware utensils, simple furniture made by the village carpenter, chunam or lime for his chew of betel, and perhaps a little arrack at times, sum up most of his requirements.

The sale of a little rice, a few cocoanuts, some betel nuts or leaves, or (if he live near a town and has become enterprising) of some vegetables or fruit, will provide him with these. He is usually in debt for advances on his crops, if not actually for loans on his land itself, to the money lender or the village shopkeeper—often the same individual.

PLOUGHING A PADDY FIELD.

Photo by Sheen & Co.

Only too frequently the latter becomes at last the possessor of the land, while the former owner works on it as tenant, or even as cooly, or drifts away into the town or into the less settled parts of the country.

To live a strenuous life for the sake of gain or social advancement is foreign to the habits of mind and body of the village farmer. Let him but make sufficient for his wants, to bring up his children, and to pay the interest or renewals on his debts, and he is generally content. He does not aim at creating trade; his caste, unalterable by riches or poverty, is commonly high, he likes to take his ease and pleasure with his family and friends. Further, he has not the capital nor the land necessary for such a speculative occupation as growing crops upon which he cannot actually live, but which he has to sell in a market whose fluctuation is beyond his knowledge or control, and in which therefore he is largely at the mercy of the middlemen or combinations of middlemen who buy his crops. Not that he is averse to making money, but he cannot afford to risk even a small sum, most often, probably, has not the sum to risk. This is the true explanation of much of his obstinate conservatism—a conservatism by the side of which that of the small European or American farmer is change and progress of the swiftest.

Agriculture as carried on by European planters, chiefly in the hilly or mountainous regions of the Island, presents a different picture, comparable to the state of affairs seen in the great wheat or fruit industries of the Western States. To some extent this is also true of the larger native proprietors. The greatest keenness is displayed to take advantage of every improvement in machinery or methods, labour-saving and economy in working are made the objects of strenuous endeavour, large sums of money are raised by a voluntarily imposed compulsory tax on exports to provide the sinews of war for exploiting new markets, and experiments are made with new cultivations, often with far-reaching results. On the planting industry of Ceylon depends the larger part of the Island's export trade and a very great proportion of the revenue.

The villager rarely goes out to regular paid field work, but cheap and plentiful labour is provided by the immigration of hosts of Tamil coolies from Southern India, attracted to Ceylon by the higher rate of pay obtainable. They are a hardworking and docile folk under kind and firm treatment, and most of the harder physical labour in the Island, apart from that performed by villagers on their own land, is done by them. They do not as a rule settle in Ceylon, but return with their savings to their native villages.

No fewer than about 400,000 such coolies are at present working on some 2,000 Ceylon "estates," *i.e.*, plantations of at least 20 acres. The total cultivated area of the estates amounts to about 466,000 acres.

As the Island does not grow enough rice for its own consumption, the villager seldom having much to sell after supplying his own wants, an immense importation of rice from India is constantly going on, and the import duty on this figures largely in the Colonial revenue. A large part of this rice goes to feed the immigrant coolies in the mountain districts, and so a further large contribution to the revenue is made through the rail freight paid on it, the railroads being Government property. The chief traffic is due to the planting industry—tea and cacao going to the ports, manure, rice, and materials for tea manufacture and packing going the other way. Thus, through the Customs and the railway, the planting industry contributes an immense proportion of the total revenue of the Island, and it has been largely through this that the Government has been able to do so much for the opening up of the Island generally by public works of all kinds, bridges, roads, rail roads, and great irrigation works. A conspicuous illustration of how greatly the Island depends on the planting industry for its prosperity was afforded by the way in which all public works were crippled during the period of the collapse of the coffee industry. Not merely did this react directly on the Customs and the rail receipts, but indirectly it ruined more or less the numerous subsidiary industries which depend on planting, and impoverished thousands of natives of all classes, as well as the planters and the mercantile community of Colombo, who are mainly dependent on the trade created by the planting industry.

The history of European planting in Ceylon is a wonderful story of brilliant successes chequered by dismal failures, which again have been retrieved by indomitable pluck and energy. With the conquest of the Kandyan kingdom—the mountainous region of the centre of the Island—and the opening of the road to its capital, the country was thrown open to English enterprise. Conspicuous among the first pioneers of planting was Sir Edward Barnes, the then Governor, who in 1825 opened the estate of Gangaruwa, near Peradeniya, now the Government Experiment Station. Much money was vainly expended at first in trying sugar, indigo, and other Indian crops, but presently it was discovered that the cleared forest land was eminently suited to the growth of coffee. The time was favourable, the duty on coffee in England had just been reduced, its consumption was

increasing in Europe, and the West Indies were handicapped by difficulty with the slaves. By 1838 the success of the industry was assured, and in that year 10,401 acres of Crown forest land were sold to planters, while in 1841, when the rush was at its height, no less than 78,685 acres were disposed of. "The coffee mania was at its climax in 1845. The Governor and the Council, the Military, the Judges, the Clergy, and one-half the Civil Servants penetrated the hills and became purchasers of Crown lands.........capitalists from England arrived by every packet.........So dazzling was the prospect that expenditure was unlimited; and its profusion was only equalled by the ignorance and inexperience of those to whom it was entrusted. The rush for land was only paralleled by the movement towards the mines of California and Australia, but with this painful difference, that the enthusiasts in Ceylon, instead of thronging to disinter, were hurrying to bury their gold." (*Tennent.*)

The inevitable collapse soon followed, and for some years the coffee industry was almost paralysed, but by 1855 it had more than recovered the lost ground, and was conducted on more practical and economical lines. From that date to about 1882 it was the staple export industry of the Colony, reaching its maximum in 1875, when almost 1,000,000 cwt. of coffee were exported. About 1870 the plants began to be noticeably attacked by a fungus blight—*Hemileia vastatrix*, the coffee leaf disease—which spread steadily and irresistibly over the vast sheet of coffee plantation in the mountains, and was disregarded until too late, if indeed any practicable measures could have been adopted against it at any time in its history. By 1880 the industry, though still considerable, was in a parlous condition, and the planters in great distress, but with the most commendable pluck they set themselves to redeem their fallen fortunes, aided by the efforts of the Botanical Department of the Government. Cinchona trees—the source of the valuable alkaloid quinine —introduced by Government years before, but disregarded so long as coffee was profitable, were now the salvation of the Island. Large areas were planted with this product, and at first large profits were realized, but soon over-production rapidly brought down the price of quinine, to the incalculable benefit of sufferers all over the world, but to the ruin of the profitableness of the Ceylon bark industry—a ruin consummated by the attacks of a canker disease and the competition of better barks from Java. The gap, however, was bridged, and by the time that cinchona had passed its zenith it was clear that tea was the industry of the future, and large areas were being rapidly planted up in it, while an

export was already commencing, Ceylon tea being favourably received upon the markets of Europe. The rise of the tea industry has been phenomenal, and it is hardly safe to assume that it has even yet reached its maximum.

During the collapse of coffee a great number of other products, hitherto more or less vainly pressed upon the attention of coffee planters, received a thorough trial, with the result of the establishment of several important minor industries, the chief among which are cacao or chocolate and cardamoms. The cultivation of Ceará rubber also assumed some importance about 1882, but has since gradually dwindled, while in recent years that of Para rubber has come into prominence, bidding fair in a few years to form one of the chief export industries of the Island.

In comparing the agriculture of Ceylon with that of countries further north the climatic conditions are of the first importance. There is no winter, nor even a "cold weather" as in Northern India, to interrupt vegetation; the interruption, such as it is, comes rather from drought. The Island may be roughly divided into a wet zone and a dry zone. The former, comprising the bulk of the mountain region and the south-western plains lying between it and the coast from Negombo to Matara, receives much rain from both the monsoons, the latter only from the north-east monsoon. The monsoons begin with very wet weather and end with drier periods. Hence in the wet zone the only really dry seasons are the end of the south-west monsoon in August or September, and that of the north-east in January, February, and March. The latter on the western side of the main watershed, and the former on the eastern side, is the "dry season" par excellence, when at times the country shows signs of becoming parched with the heat of the sun, the showers being few and far between. In the dry zone, on the other hand, the "dry season" begins in January, lasting through the remainder of the north-east and the bulk of the south-west monsoon, broken to a slight extent by a few showers in May, June, or September. During this long drought the country lies parched under a burning sun, except in the cloudy months of the south-west monsoon.

These two zones, the wet and the dry, are sharply distinguished no less by their flora and their agriculture than by their climate. The rich luxuriant vegetation of the wet zone —the only part of Ceylon that most residents or visitors ever see—is replaced by a scanty parched herbage in the open country and by a thin undergrowth in the forests. While in the wet zone there are two crop seasons, one in each monsoon, in the dry there is but one, that of the north-east

A TOWN BOUTIQUE.

Photo by Sheen & Co.

monsoon, seed time beginning with the rains in October and harvest with the dry weather of January ; by May most of the crops of whatever kind have been gathered in. Only with the aid of irrigation can two crops be obtained in the year, and even to ensure the success of any of the longer-lived crops, such as tobacco, for their single season, irrigation is needed. In the latter case it is generally conducted from wells by hand labour, but to obtain two crops of rice, which requires a large quantity of water, regular irrigation from tanks is necessary. In the days of the ancient Sinhalese kings, when the capital lay in the dry zone, a vast system of cleverly planned irrigation works covered the country like a network and supported a dense population. Invasion, with the consequent disorganization of the working of the sluices and overflows, resulted in the final complete destruction of these wonderful works by the breaching of the tanks, and the country became a wilderness, with but a few sickly, poverty-stricken inhabitants, and overgrown with forest. Now, in recent years, after a neglect of many centuries, these works are being restored by the Government, and the country thus gradually rendered both more healthy and more productive. Already the population is on the increase, and with the opening of new irrigation works and the completion of the railroads it will probably again become an important centre of agriculture.

The soils of Ceylon are very poor, being mainly derived from gneissose rocks, with dolomite or coral in places ; and the fertility of the Island is mainly due to the genial climate.

Areas under Cultivation.

The Island comprises about 16,200,000 acres, of which about 3,500,000 are at present cultivated, the chief cultivations being :—

	Acres.		Acres.
Rice ...	610,000	Tobacco ...	25,000
Dry grain ...	120,000	Tea ...	385,000
Cocoanuts ...	660,000	Cacao ...	35,000
Other palms ...	110,000	Rubber ...	11,000
Fruits ...	250,000	Cardamoms ...	10,000
Vegetables ...	150,000	Other spices ...	4,000
Cinnamon ...	40,000	Coffee ...	4,000
Citronella ...	35,000	Cinchona ...	3,500

The left-hand column represents mainly native industry, the right-hand European. The figures for fruits, vegetables, and other palms, added to about quarter to half of those for cocoanuts and dry grains, represent together the approximate area of the high lands round the native houses bearing the mixed vegetation above described.

Botanical and Agricultural Department.

Recognizing that the Island depends so largely on the success of its agricultural industries, the Government of Ceylon endeavours to aid the progress of these industries by keeping up, not only an Irrigation Department, but a Scientific Department in which, as in the Agricultural Department of the United States, a scientific study is made of the botany, entomology, agriculture, and horticulture of the Colony, with the object of aiding cultivators by introducing (or breeding) and distributing new products suitable for cultivation or trial, or new varieties of those already existing, by studying to improve the methods of cultivation and preparation of products, and by investigating the diseases that attack

ASSAM RUBBER TREE, PERADENIYA.

cultivated plants and recommending methods of treatment. Commencing so far back as 1810, this Department, which now has its headquarters at Peradeniya, near Kandy, and whose title—The Royal Botanic Gardens—now but incompletely expresses its varied range of activities, was at first intended for the study of the botany of the Island, the investigation of its resources in useful plants, and the introduction in small quantities of useful and ornamental plants from other climates, their trial on a small scale, and the subsequent supply of small quantities of seeds or plants to any one who might care to try them further. This branch of work was

carried on with many remarkable successes, and several plants thus introduced into Ceylon are so common or so widely used that they are often supposed to be indigenous to the country or cultivated there from the earliest times. Of all the introductions, the most timely and valuable was perhaps cinchona, which, as mentioned above, was the salvation of the planting industry in the dark days of the coffee disease. Another introduction of great importance was cacao, and a third, which is now rapidly rising into prominence, the Para rubber tree of the Amazon valley.

In recent times the importance of this work has gradually decreased as most of the valuable products have one by one

GREAT CIRCLE, PERADENIYA GARDENS.

been introduced into Ceylon. There are now but few products which have not been tried at one time or another, and there are no longer any important products in which, as in the cases of cinchona or rubber, the competition is only with wild forest produce or, as in the case of tea, with produce grown by backward races with primitive methods. Nearly all important tropical products are now being systematically cultivated by enterprising European or American planters or Governments, with all the aid which science or politics can give, and the competition is becoming daily more severe. It is now of greater importance to keep and improve those industries that already exist than to look

for new ones to take their place if they should collapse as coffee collapsed, though it is still desirable to introduce new ones or increase others to form second strings to the bow. To meet this phase of the situation the old organization of the Botanic Gardens has been much enlarged, and the Department now has three distinct branches, the Scientific Division, the Division of Botanical and Horticultural Gardens, and the Division of Experiment Stations. The first comprises the scientific staff, five in all, who carry on researches into the botany, entomology, and agriculture of the Island, and give advice and help in all matters connected with these subjects, and especially in diseases of plants and methods of combating their attacks, plant breeding, &c. In connection with the

AVENUE OF ROYAL PALMS, PERADENIYA.

work of these officers, an economic Museum, with specimens of all the economic products of the Island, designed to show methods of cultivation, preparation, &c., is kept up at Peradeniya, as well as a Herbarium and Museum of the native and introduced plants of Ceylon, Laboratories, and a large Library. The results of work done are published in two journals, the strictly scientific results in the "Annals," and the practical and technical deductions, recommendations as to diseases, new products, methods of cultivation, &c., in the "Circulars and Agricultural Journal" of the Royal Botanic Gardens. Rooms are also reserved in the Laboratories, &c., for scientific visitors from other places, who come to

Peradeniya in increasing numbers to work at botanical and economic problems in the tropics. No charge is made for the use of the Laboratories, and every reasonable facility is provided. There is good residential accommodation at Peradeniya and most of the branch establishments, and the climate is favourable to work. Visitors of all nationalities are equally welcome.

The second division includes six botanic gardens in the ordinary sense, which are kept up at different climatic centres in the Island: Peradeniya (wet zone, elevation 1,600 ft., mean temperature 76°), Henaratgoda (wet zone, 30 ft., 81°), Hakgala (wet zone, 5,500 ft., 61°), Nuwara Eliya (wet zone, 6,200 ft., 59°), Badulla (eastern wet zone, 2,200 ft., 73°), and Anuradhapura (dry zone, 300 ft., 81°). Of these, the chief are Peradeniya and Hakgala, in which an endeavour is made to have representatives of all plants known in Ceylon, whether native or introduced, and in which the introductions from abroad are first planted. The other gardens are mainly small, intended for the trial of a few selected economic and ornamental plants in the different climatic conditions which they represent. In addition to making these index collections of the plants which can be grown in different parts of Ceylon, the gardens try experiments in horticulture, growing plots of fruits, flowers, and vegetables for trial of the best methods of cultivation and treatment; they form beautiful places of resort and instruction for the public; they supply seeds and plants in small quantities to applicants, and by example and correspondence and in other ways endeavour to keep up and improve the standard of horticulture in the Island.

TREE FERN, HAKGALA.

The improvement of agricultural crops, methods of cultivation, or preparation of products for market requires experiments on a large scale, quite impracticable in the small area of the Botanic Gardens, and to attend to this branch of

work is the business of the Experiment Stations, of which there are at present two, one of over 200 acres (exclusive of a large reserve of forest land) at Peradeniya in the wet zone, and another of 150 acres at Maha-iluppalama in the dry zone; the latter has been temporarily established with the object of trying cotton and a few other products on irrigable and unirrigable land. On the Peradeniya station experiments are tried on a commercial scale: (1) with the existing staple products of the Island, such as tea, cacao, citronella oil, &c., with the view of finding out the best manures, improving the methods of cultivation and preparation, selecting the best seed for propagation, &c.; and (2) with products not as yet staples, but which give hope of becoming such, *e.g.*, peanuts, castor oil, &c.

Thus the Department of the Royal Botanic Gardens provides a bureau of technical scientific information and advice, to which any one may apply for information, advice, or help in any matter connected with agriculture, horticulture, botany, entomology, or allied subjects. To it apply in ever-increasing numbers those whose crops are troubled with insect or fungus diseases, those who think of trying some new product which they have not hitherto attempted to cultivate, those who wish for advice as to what to grow in some newly opened district, or who wish for help in their gardening difficulties, and so on. The information gathered by the Department by means of experiments, reading, and correspondence is placed freely at the service of all by publications, personal interviews, visits to estates and districts, lectures, and a large correspondence.

In relation to this Department and under the Department of Public Instruction there exists a useful organization for the improvement of village agriculture and gardening, in the form of School Gardens, as described in Chapter III. This organization depends largely upon the Botanic Gardens for the supply of plants and information, and forms a means of introducing new cultivations into the villages.

Tea.

The rise of the tea industry of Ceylon affords one of the most remarkable instances of rapid development of an agricultural pursuit, especially when the previous history of the planting industry is remembered. In 1875 there were barely 1,000 acres planted with tea. During the next ten years of depression, due to the failure of coffee, this acreage increased to 102,000; by 1889 it attained 205,000, by 1893 305,000, and it is now about 385,000. The Island

TEA ESTATE. WITH ADAM'S PEAK IN THE DISTANCE.

Photo by Skeen & Co.

imported its tea in the early days of tea planting, but in 1883 the export exceeded 1,600,000 lb., in 1887 it was 13,813,872 lb., in 1896 108,141,412 lb., and in 1903 (including green tea) no less than 151,120,009 lb. For the present, at any rate, the growth of the industry seems to have reached its upper limit.

Tea is now the chief industry in the mountain districts, and also covers a large area in the south-western plains. Above the elevation of 2,500 ft. it forms almost the only cultivation, and a journey on the rail from Kandy to Nuwara Eliya affords perhaps one of the most striking instances in the world of a large stretch of country covered with one crop. Excepting only the summits of the mountain ridges, the grass lands, and the actual precipices, a vast sheet of tea covers hill and dale, broken chiefly by the straight lines of the "wind belts," narrow belts of Australian trees planted through the tea fields across the direction of the prevailing winds.

By far the largest proportion of the tea cultivation is in the hands of European planters resident on the estates. The average size of an estate is between 250 and 300 acres, but there is a tendency of late for estates to be united in groups for economy of working and management, and to enable larger and more economical factories to be used. Whereas formerly a large proportion of the planters were owners of their estates, they are now more often salaried employés of large or small companies, some managed locally, some directed from London. The export and general business of the estate or company is worked through a Colombo agency, which also superintends the general conduct of the estate by means of its "visiting agent," a planter of long experience, who goes over the estates at intervals, inspecting their working, estimates, accounts, &c.

The labouring force of a tea estate consists generally of Tamil coolies from Southern India, working in gangs under overseers locally termed kanganies, by whom they are recruited from their villages. As a rule they return after a time with their savings, but some settle in Ceylon. The rate of wages on a tea estate seems small, being only from eight to fifteen dollar-cents a day (average about twelve), but is high enough to make Ceylon seem a kind of Eldorado to the coolies. They are housed and medically attended at the cost of the estate, and their well-being is carefully attended to. The heavier labour is done by the men, the lighter, such as tea plucking, by the women and children.

Several varieties of the tea plant are known; the China variety is now but rarely cultivated in Ceylon, the usual

ones being the Assam indigenous and the Hybrid, a cross between this and the China. Both of these have larger leaves and yield more crop. The tea plant, a small tree when left to itself, is cultivated on estates in large fields, in which the plants are placed about 4 feet apart and severely

TEA LEAF, FLOWER, AND SEED.

pruned at intervals of eighteen months or two years. They thus form squat bushes about 3 feet high and with flat spreading tops, so that it is easy for the coolies to get at the young shoots which are constantly appearing on the top of the bushes. These shoots, taken together, are termed the

"flush," and the object of cultivation and pruning is to ensure large, frequent, and regular flushing. In the colder climates of China and Assam flushing ceases in winter, but in Ceylon it goes on all the year round.

Tea manufacture consists essentially in the plucking of the young shoots of the flush and their subsequent treatment by withering, rolling, fermenting, and dryingto form tea. In Ceylon the flush is plucked every eight to twelve days by women and children working in gangs under kanganies. They soon become remarkably quick and expert at the work.

SORTING LEAF IN THE FIELD.

Plucking is designated as "fine" when the bud at the tip of the shoot and the two young leaves just below it are taken, "medium" when the bud and three, "coarse" when the bud and four leaves are taken. At present fine plucking is much the most usual. The coarser the plucking, the poorer the average quality of the tea produced, though the greater the quantity. Fine plucking produces the various teas known as pekoes, while older leaves give souchongs and congous. Pekoes consisting only of the buds or tips are known as "flowery," those containing also the first young leaf as "orange" pekoes.

The coolies bring in their day's plucking to the factory, usually a large well-equipped building, containing the most modern machinery, and worked by water or steam power. The "leaf" is examined and weighed and the amount plucked by each cooly recorded, the wage depending partly on the amount plucked.

After the leaf has been weighed it is taken to the upper floor of the factory and thinly spread out on light open work shelves of jute hessian (canvas), known as tats, to wither. In good weather it becomes limp and flaccid in about eighteen hours, but in wet weather artificial heat is employed and a current of warm dry air drawn through the withering

WITHERING TEA LEAF.

loft. The properly withered leaf is next thrown down through shoots into the rollers or rolling machines in the ground floor. A roller consists essentially of a table with a central depression to hold the leaf, and a hopper above it, the two moving over one another with an eccentric motion. Pressure to any required extent can be put upon the mass of leaf that is being rolled, and at the end of an hour or so the door in the bottom of the table is opened and the "roll" falls out, the leaves all twisted and clinging together in masses, which are then broken up in a machine termed a roll breaker, to which is usually attached a sifter that separates the coarser leaf from the finer. After this the leaf

is piled in drawers or on mats to ferment or oxidize, with free access of air. This process is omitted in the manufacture of green tea. In a couple of hours or so, depending on the weather, the leaf assumes a coppery colour, and gives out a peculiar smell. Experience is required to determine the exact point at which to check the fermentation and place it in the firing or drying machines. There are many types of these machines, but all act by passing a current of hot dry air through the damp fermented leaf until it is dry and brittle, when it is removed, sifted into grades by a machine composed of a series of moving sieves of different sizes of mesh, and finally bulked (*i.e.*, the whole mass of each grade made on one or more days is thoroughly mixed together, so as to secure as great uniformity of quality as possible), packed in lead-lined boxes of about 100 lb., soldered up, labelled

INTERIOR OF FACTORY (ROLLING AND BREAKING).

with the name of the estate, and despatched to the port for shipment.

The grades of tea usually prepared in Ceylon are known (in order of quality and value) as orange pekoe, pekoe, pekoe-souchong, souchong, congou, and dust.

Green tea, made in the same general way as black, but withered by means of steaming, and prepared without fermentation, is graded as young hyson, hyson (1 and 2), gunpowder, and dust.

The greater part of the tea shipped from Ceylon at present goes to the United Kingdom, but the exports to other countries are steadily increasing, so that they bid fair soon to form one half of the total. The next best customers of Ceylon are Australia, Russia, and America. The last-named market is the chief destination of the green tea made in Ceylon.

Twenty years ago China still supplied the bulk of the tea consumed in Britain, while India provided about one-third, and Ceylon's share was but a poor 1 per cent. Now Ceylon's proportion of the total is 35 per cent., and that of China has sunk to 8 per cent. In the early days of planting in Ceylon much better prices were obtained than at present; the price steadily fell from $0·30½ a pound in 1885 to $0·13½ in 1902; in January, 1904, the average wholesale price in bond in London was $0·14½ a pound.

Coffee.

Arabian coffee cultivation, the mainstay of Ceylon agriculture from 1840 to 1880, has now shrunk to a mere shadow of its former greatness, the area occupied being only about 4,000 acres, as against 275,000 in 1878, and the export in 1903 9,862 cwt., against 974,333 cwt. in 1877, the year in which it reached its maximum. The chief cause of the decay of the industry was, as mentioned above, the attacks of disease, but at present the low price of coffee, due to the enormous production of Brazil, tends to prevent any attempt to resuscitate the cultivation on better lines.

The shrub is cultivated on estates between 3,000 and 5,000 feet above sea level; the ripe cherry-like fruits are picked, the pulp and the parchment-like seed coats removed, and the seed kernels or coffee beans exported.

Liberian coffee, a hardier species, is also cultivated to a slight extent, but its product obtains a much lower price, and the cultivation is dying out.

Cacao, Cocoa, or Chocolate.

This product is the third in importance among the Island's exports, and second only to tea in the European planting industry. The quantity exported in 1903 was no less than 6,686,848 lb.

Cacao plantations cover an area of about 35,000 acres, chiefly in the districts north and east of Kandy, where the deeper alluvial soils of the Matale and Dumbara valleys,

KANDY, THE MOUNTAIN CAPITAL OF CEYLON.

Photo by Skeen & Co.

lying at an elevation of 1,000 to 2,000 feet above sea level, are largely planted with this tree. A cacao estate in itself is more beautiful than a tea plantation; instead of the dwarf closely trimmed bushes, it is composed of graceful trees with drooping branches, growing to a height of about 15 or 20 feet, and interspersed with taller trees of dadap or bois-immortelle to form a light shade for the cacao trees. When in young leaf a cacao plantation is particularly beautiful; the newly-formed foliage is of a pink or red colour, and the trees in this condition remind the traveller of the lovely autumn colours of the maples and sumacs of the Eastern States. As is so often the case with tropical trees, the flowers of cacao appear, not on the young, but on the old wood, covering the trunks and stouter limbs with little bunches of white or pink blossom. These are followed by the fruits, large, almost bottle-shaped fleshy pods, reddish, yellow, or green in colour according to the variety, and containing a number of seeds each with a coating of mucilaginous matter.

CACAO TREE IN FRUIT.

The ripe fruits are picked and carefully split open; the seeds are removed and piled in heaps to ferment under covers of leaves and sand. The heaps are turned over and remixed every day or two until the fermentation is complete. The seeds are then washed in water to remove all the mucilage, and are dried in the sun on open courts or barbecues. The fully dried "beans" have a plump appearance, a pinkish or purplish colour, and the kernels when broken across show a whitish, pinkish, or purple colour, according to the variety cultivated. The lighter the colour of the "break," the higher the value of the cacao. Ceylon cacaos have usually attained almost the highest market prices on account of their excellent curing and good break, due to the good qualities of the variety that until a few years ago was almost the only one grown in the Island, and known as Criollo. Lately, however, it has been

to a considerable extent replaced, as in former years occurred in the West Indies, by the Forastero varieties, whose seeds have a more purple break.

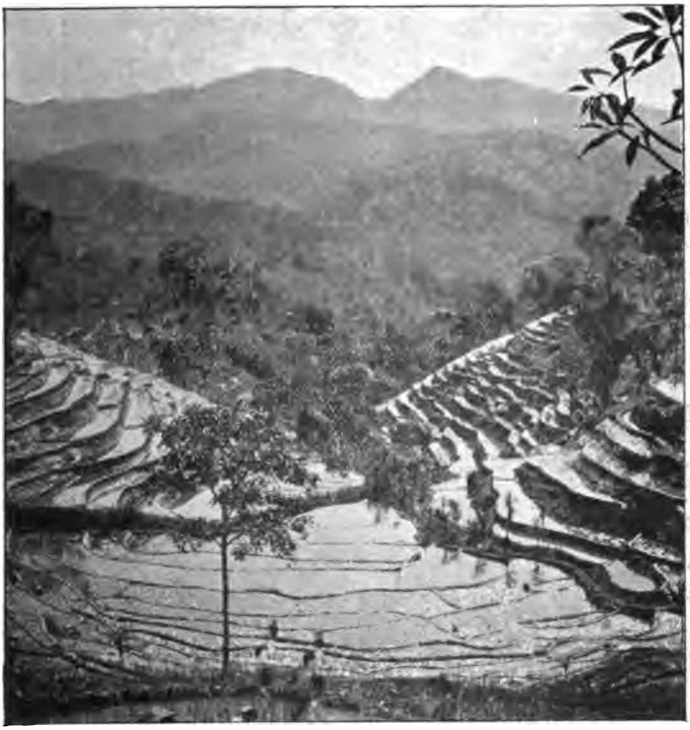
DRYING CACAO.

Rice,

Rice (*Oryza sativa*) occupies in Ceylon and other Eastern tropical countries the important position as the staple grain food which in colder climates is held by wheat. Though less nutritious than the latter, it is a good food stuff; it is eaten boiled, usually in the form of curry—a heterogeneous mixture of food stuffs and flavouring matters, made up in a wonderful variety of combinations, each with its characteristic taste.

Some 660,000 acres are occupied with this cultivation; some of the most characteristic features of Ceylon life and scenery are connected with the various phases of growth of the paddy. Rice, unlike other cereals, is semi-aquatic, and has to be cultivated with the base of the plant constantly irrigated with some inches of water. The fields are therefore carefully levelled and enclosed within low banks of earth, while the water is let in on the upper side of the field and carefully guided through it to the exit on the lower side, for

it is evident that rice fields so constructed must form a series of terraces. In the lower slopes of the mountains, *e.g.*, in the Kandy District, these terraces afford a most striking picture, being carried up steep, even precipitous slopes for many hundreds of feet above the bottoms of the valleys. In the wet zone, and also in irrigated parts of the dry, there are two crops each year, the larger or maha crop in the



TERRACED PADDY FIELD.

north-east, the smaller or yala crop in the south-west monsoon. In the drier weather of the end of the monsoon the crop is harvested, and the fields, now dry, form grassy pastures on which the cattle graze, while here and there are circular threshing floors, on which the grain is beaten out of the straw by the treading of buffaloes or oxen, in the world-old Asiatic way, and winnowed by being thrown into the air from flat basketwork trays. With the advent of the rains

of the next monsoon water is let into the fields, and the ground when softened is ploughed with a simple native plough drawn by a pair of buffaloes. It is then worked with large hoes (mamoties) till it forms a creamy mud, on which the seed is sown, and when the seed has sprouted the water is let into the field and the plants are grown under irrigation until nearly ripe, when the water supply is cut off and the

WINNOWING PADDY.

crop finally ripens on the dry fields. The various kinds of paddy require from three to six months to ripen from the time of sowing to that of reaping. The amount of irrigation water needed by these varies very materially. Along the western and southern coasts and in the Central Province the period of growth is from three and a half to six months.

In the Northern Province there is one kind of rice, "perunella," which takes as long as six months to mature, all other varieties from that part of the Island maturing in from three to five and a half months. The local selling price of paddy varies considerably in different seasons, according to abundance or poverty of yield as well as the means of transport to other markets. At times it will sell at less than a rupee a bushel, at other times at one rupee and a half to two rupees the bushel. One bushel of paddy (*i.e.*, rice in the husk) yields half that bulk of cleaned rice.

The present yield is probably about 8,500,000 bushels of rice, being about fifteen-fold on the quantity sown. The imported rice amounts to some 8,000,000 bushels, costing over $5,000,000.

Fine or Dry Grains.

These terms are used for the small cereals and pulses which can be grown on unirrigated land. They are but little grown where there is plenty of rice land and water available, but are largely cultivated in outlying districts, especially on chenas (page 71). Their value as food is lower than that of rice, but they are easy to grow and yield a large return on newly chenaëd land.

The most commonly cultivated kinds are kurakkan (*Eleusine Coracana*), amu (*Paspalum scrobiculatum*), meneri or millet (*Panicum miliare* and *P. miliaceum*), tana-hal or Italian millet (*Setaria italica*), kumba or bulrush millet (*Pennisetum typhoideum*), muneta, in its two varieties, green and black gram (*Phaseolus Max*), and kollu (*Dolichos biflorus*). A hill paddy is also frequently grown at elevations higher than that at which the ordinary rice will grow. Maize or Indian corn (*Zea Mais*) is grown in small quantities, usually mixed with other dry grains, but has never become a favourite food of the natives.

Flours.

Flours are made from a number of the cereals above mentioned, and also from the fruit of the plantain or banana, and from the pith of several palms, &c.; there is at present, however, no trade in any of these articles.

Vegetables and Fruit.

As mentioned above, a very large area is occupied by fruit trees and various kinds of vegetables, cultivated in a haphazard way round native houses throughout the Island. Systematic garden or orchard cultivation for market, on the

other hand, is but little practised, except to some extent in the cooler regions of the higher mountains, where "European" vegetables are grown for sale in the markets of Kandy and Colombo. Ceylon has no export of fruit to Europe or America, such as that which forms so great a mainstay in Jamaica and other parts of the West Indies, though there is reason to suppose that such an industry might pay well enough if started on a large scale with sufficient capital to provide for the supply of large quantities of fruit to the markets of Europe. Plantains (bananas) are exported to India.

COCOANUTS AND PLANTAINS.

The chief fruit trees are mentioned above, viz., the jak, breadfruit, plantain, mango, lime, orange, papaw, pomegranate, custard apple, pineapple, and rambutan.

The vegetables are chiefly yams, gourds, sweet potatoes, beans of various kinds, onions, and numerous more or less strongly flavoured "curry stuffs."

Products of the Cocoanut Palm.

With the possible exception of the palmyra palm, there is probably no single plant capable of so great a variety of uses as the cocoanut palm, which forms one of the greatest

EW IN THE PERADENIYA GARDENS. *Photo by J. C. Willis.*

staples of Ceylon agriculture, both for local use and for export. Luxuriantly though it grows in Ceylon, especially in the coast regions of the south and west, there is good reason to suppose that it is not strictly native, but was brought by the equatorial currents from further east in very early times. It flourishes best in the wetter coast regions, but is also cultivated to a considerable distance inland and up to a height of about 2,000 ft. above sea level. The cultivation is mainly in native hands, though in recent years a number of Europeans have invested in what is sometimes termed the "consols of Ceylon planting." Almost every Sinhalese hut has a few of these palms near it, and many very large cocoanut estates are cultivated by wealthy native proprietors.

The villager obtains from this palm many of the necessaries of life: the large leaves are woven into thatching "cadjans," into mats, baskets, &c.; their stalks and midribs make fences, brooms, yokes, and many other utensils. The trunk affords rafters, beams, troughs, canoes, and many articles of furniture, &c. The bud or "cabbage" at the apex of the stem makes an excellent vegetable, and is made into preserves. When the palm is flowering the main flower stalk can be tapped for toddy—a drink like the Mexican "pulque," containing a lot of sugar. Evaporation of the toddy furnishes a coarse but good sugar known as jaggery; its fermentation gives an alcoholic drink, from which distillation produces the strong spirit known as arrack, while further fermentation gives vinegar.

The fruits while young contain a pint or more of a cool sweetish watery fluid, which affords a most refreshing drink. As the nut ripens the water decreases and the kernel hardens. The nuts are gathered at about ten months old. Their kernels are eaten raw, in curries, and in other ways, milk is expressed from them for flavouring curries and other purposes, and oil is extracted from them by boiling. The commercial oil, in which there is a very large trade, is obtained by first drying the kernels in the sun or by artificial means till they form what is termed copra, and then pressing this copra in mills. About two-thirds of the weight is obtained as oil, and the refuse "cake," or poonac, forms a valuable fattening food for cattle and poultry. The oil is occasionally used for lighting, but its great use, especially in Europe, is for soap making; it also forms a good hair dressing, and is largely used for the manufacture of candles, as it separates under pressure into a hard wax-like body, stearine, and a liquid oleine. The shell of the nut, after the kernel is taken out, forms drinking cups, bowls,

spoons, handles, and many other things; it also makes an excellent smokeless fuel, and yields a good charcoal.

In recent years a large industry has sprung up in desiccated cocoanut, *i.e.*, the kernel of the nut sliced and dried in special desiccators. The product is soldered up in lead-lined boxes and exported for use in confectionery.

The thick outer husk of the cocoanut, rarely seen in America or Europe, contains a large number of long stout fibres running lengthwise. The villagers obtain these by splitting the husks, rotting them in water, and then beating out the soft tissue from the fibres. There are also many large mills where special machinery is used for preparing coir, as this fibre is called. The uses of coir are many; the fibres are graded according to their stoutness, and used for making brushes, yarn, rope, mats, and for many other purposes. There is a large export to Europe and America.

It is supposed that the cocoanut palms of the Island produce about 800,000,000 nuts annually, and that about half of the crop is used locally. The export trade is very large, and during 1903 the chief elements of it were as follows :—

Cocoanut oil ...	665,357 cwt.	Desiccated cocoanut	485,269 lb.
Copra ...	721,575 „	Coir ...	244,965 cwt.
Poonac ...	299,972 „	Arrack ...	72,619 gals.

Nuts ... 13,129,349

Cinnamon.

This spice was the most famous of Ceylon's early exports to Europe, and until 1833 its cultivation was a Government monopoly, first under the Dutch and afterwards under the British Government. Since that period the cultivation has greatly extended, chiefly on the light sandy soils near the south-west coast, where the spice is native. At the present time about 40,000 acres are in cultivation. Left to itself, the cinnamon plant (*Cinnamomum zeylanicum*) would form a small tree, but in cultivation it is kept coppiced, sending up long willowy shoots, whose bark, peeled off and dried and rolled into quills, forms the spice of commerce. The cinnamon peelers form a separate caste among the Sinhalese. The finer quills are made up into bales, while an inferior grade is shipped under the name "chips." There is also a small export of so-called "wild cinnamon," the produce of certain jungle trees belonging to the same family, and often scented with true cinnamon oil.

A considerable quantity of cinnamon oil is distilled in the Island from broken quills and larger fragments of bark.

Another oil, with somewhat the smell of oil of cloves, is distilled from the leaves.

Cinnamon is used chiefly in confectionery, incense, &c. A considerable proportion of the exported chips are used in Europe for the distillation of oil. The exports in 1903 were 3,043,714 lb. in bales, 2,253,269 lb. of chips, and 90,469 oz. of oil.

Cardamoms.

Though at present third in importance among the exports due to the European planting industry, this spice is still but little known in Europe or America. It is chiefly used in India for cooking, confectionery, and masticating, but is coming steadily into use elsewhere, and deserves to be more widely known. About 10,000 acres, chiefly in the mountain districts north-east of Kandy, at an elevation of about 3,000 to 4,000 feet, are now devoted to this spice. The plant itself (*Elettaria Cardamomum*) belongs to the ginger family, and is not unlike ginger in appearance, but very much larger, growing to a height of 10 feet. It is cultivated in clumps under the shade of the trees of the forest, which has its undergrowth thinned out to make room for it. The flowers are borne in little racemes, and succeeded by little capsule fruits, which are cut off with scissors, spread out in trays or on barbecues, and slowly dried and bleached. The essential part of the spice is the seed contained in the capsules, but the latter are always dried with the seeds, and so far as possible without splitting. If the seed were sold without the capsules, they could be easily adulterated with other similar and less valuable seeds.

PICKING CARDAMOMS.

The export of cardamoms in 1903 was 909,418 lb.

Other Spices.

Besides those mentioned, Ceylon cultivates nutmegs, pepper, cloves, vanilla, and several other spices, but only in small quantities, the exports in 1903 being—

Nutmegs	... 11,760 lb.	Pepper	... 65,744 lb.
Cloves	... 4,368 „	Vanilla	... 896 „

Tobacco.

Ceylon, though unknown in European or American tobacco markets, yet has a large trade in this article, locally and with South India, for which a coarse heavy tobacco is grown on about 25,000 acres of land in the Jaffna District of the Northern Province. The great object of the grower is weight; the particular variety cultivated produces very large leaves, and the curing, instead of being spread out over several weeks, occupies only as many days, resulting in a rank tobacco with so strong a flavour that few white men can acquire a taste for it. A small quantity of better leaf is grown in Dumbara, near Kandy, and cheroots made from this have a local sale among Europeans in Ceylon; in flavour and quality they resemble the well-known Trichinopoli cheroots of Southern India.

Drugs.

Cinchona, whose bark is the source of the valuable alkaloid quinine, once the mainstay of the Ceylon planting industry, now occupies but a very minor place, though a little replanting of certain areas with the best varieties of Java trees has lately been going on. A small quantity of bark is still exported, the amount in 1903 being 170,565 lb., a remarkable contrast to 1886, when the export reached the enormous figure of 15,892,678 lb., valued at Rs. 4,028,579, or $1,450,000 at the rate of exchange then ruling.

Coca (*Erythroxylon Coca*), the South American shrub whose leaves yield the valuable drug cocaine, was introduced through the Botanic Gardens years ago; of late its cultivation has been taken up with success on a small scale, and the Ceylon exports are now obtaining the highest market prices. Another drug plant cultivated in a few localities is the Croton (*Croton Tiglium*), whose seeds yield croton oil, a very powerful purgative. A small export of seeds goes on.

Fibres.

By far the most important fibre produced in Ceylon is coir, the fibre of the cocoanut palm, already described. In addition to this there are two other important palm fibres

A PALM-FRINGED BEACH.

Photo by Plâté & Co.

produced from the bases of the leaves of the palmyra palm (*Borassus flabellifer*) and the kitul (*Caryota urens*). The latter is grown in the Kandyan districts; the former takes the place of the cocoanut in the drier Tamil districts of the north and east, affording many of the necessaries of life to the people. An ancient Tamil song in praise of this palm enumerates no less than 801 different uses to which its parts may be applied.

Many native plants yield useful fibres, but there is no trade in these other than purely local. Lately, with the rise of price of cotton, an attempt is being made by Government to resuscitate this industry, once of some importance, in the drier northern districts now being opened up by railways and irrigation.

Dyes and Tanning Substances.

Ceylon produces many of these for local use, but the exports are few and insignificant. Of dyes, sapanwood (*Cæsalpinia Sapan*) and annatto paste (prepared from the seeds of *Bixa Orellana*) may be mentioned. Of tans, many barks (more especially, of late, that of the Australian black wattle, *Acacia decurrens*, cultivated at high levels) and a few other substances, such as gallnuts or myrobolans (fruits of *Terminalia chebula*) are employed.

Oils.

Oils are usually divided into two classes, fixed oils extracted from seeds or fruits by pressure, and essential or volatile oils, obtained by distillation from different parts of plants. Of the former, by far the most important in Ceylon is cocoanut oil, already described. There are numerous other fixed oils locally employed, but there is little export of any of them. Small quantities of castor, gingelly, kekuna, margosa, and other fixed oils are sometimes exported.

Of essential oils there are several. Citronella is so important as to need a paragraph to itself; cinnamon oil has been mentioned under cinnamon; a third important one is lemon grass oil, distilled from the leaves of lemon grass, a coarse grass cultivated in the Southern Province. Like citronella oil, it is chiefly used in making scented soaps; the export is, however, small.

Citronella Oil is the essential oil of a large coarse grass, the citronella grass, a cultivated variety of the common mana grass of Ceylon (*Andropogon Nardus*). It is cultivated on about 30,000 acres of open rolling hills in the southern part of the Island, giving the country an aspect not

unlike that of parts of the Western American prairies. It grows in large tussocks, to a height of 4 to 5 feet, and is cut every three or four months. It is then distilled by means of steam ; it is packed into large iron stills, in which steam passes upwards through the grass, carrying the essential oil with it into the condenser. The oil floats on the water and is easily collected. This industry has grown from small beginnings, and has been from the first almost entirely in native hands. Unfortunately for its ultimate success it proved only too easy to adulterate the oil with kerosine and other oils, with the result that Ceylon oil now has somewhat of a bad name, and that even pure Ceylon oils cannot get the price to which their quality should entitle them. Over-production and the competition of a pure oil from Java, where European planters have lately taken up the industry, have combined with this to bring prices to a very low ebb. Lately, however, the Government Experiment Station has shown that the grass will flourish and yield a good oil at considerable elevations in the mountains, and it is possible that this may be the means of resuscitating the industry in the hands of European planters, as many of the tea estates have large areas of waste land suitable for this grass. The Government Chemist has also discovered a satisfactory test for adulteration (see page 60), showing exactly how much is present, and it is probable that legislation will be introduced to prevent the exportation of adulterated oil from Ceylon.

The export in 1903 was 1,062,594 lb., selling in London at about $0·25 a pound.

Rubber.

In the classification of the exhibits for the World's Fair rubber is treated as a forest product, and until recent years all the rubber placed on the market came fairly enough under this head, being collected from the trees growing naturally in the forests of the Amazon valley, West and Central Africa, and other tropical countries. In Ceylon, however, there are no wild forest rubber trees, and rubber production comes under the head of agriculture, the rubber-producing trees being all of foreign origin, introduced into the Island by the Government Botanical Department, and now cultivated in great numbers on estates like tea or cacao

The trees are carefully treated, and care is taken not to tap them more than they can easily stand—a proceeding which has resulted in the death of countless numbers of the wild forest trees, and rendered it necessary to go much further

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afield to obtain rubber in paying quantity than was formerly the case. The best methods of tapping the trees, collecting and preparing the milk, freeing it from impurity, and clotting it to form rubber, as well as the best ways of drying and preserving the rubber, have been carefully worked out by the staff of the Botanic Gardens and by several planters, with the result that Ceylon is now exporting a grade of rubber much superior to any native rubber whatsoever, even Para up-river fine hard cure, which is the standard of the market. The Ceylon rubber is cleaner and tougher than this, and obtains from $0·10 to $0·15 more per lb. At the same time the collection and preparation are so economically carried

RUBBER PLANTATION.

out that to produce this rubber costs less than to merely collect the wild rubber in the forests of the Amazon valley.

Three kinds of rubber-yielding trees, all of American origin, are cultivated in Ceylon. They were introduced through the Botanic Gardens about twenty-seven years ago, and gradually distributed as seed became available. The first to receive extended trial was the Ceará rubber (*Manihot Glaziovii*), a Brazilian species, which furnishes the Ceará scrap of commerce. This grows like a weed in the Island, and seeds early and freely ; it was thus largely tried in the years 1882–85, when every one was trying to find some profitable substitute

for coffee. The yield of this species, however, was found to be too small for profitable cultivation, though it paid to harvest any trees which might be growing semi-wild in waste places upon an estate. With the rush into tea that was then beginning, Ceará rubber was soon neglected, and though the Colony continues to export a little rubber of this class, the amount is negligible. Another kind which has been planted on a small scale, but which of late shows signs of extension and bids fair to be profitable, is the Panama, Central American, or Nicaragua rubber (*Castilloa elastica*), which has recently been so largely planted in Mexico by American enterprise. But the important rubber in Ceylon, the one which is being planted as rapidly as seed becomes available, and which has extended in the last few years from an area of about 100 acres to one of 11,000 acres, is the Para rubber (*Hevea brasiliensis*), the rubber tree of the Amazon valley, and the one whose product has always obtained the highest prices in the markets. This tree has shown itself eminently suited to the warm moist climate of the wet zone of Ceylon up to about 1,600 feet above the sea.

RUBBER TAPPING.

The tree is sometimes cultivated in special plantations, sometimes scattered among tea or other products. At the age of about ten years it is generally from 60 to 80 feet high, 2 or 3 feet in girth, and ready for tapping. V-shaped incisions are made in the bark with a special knife, or with a chisel and mallet, and a little tin cup, with a sharp edge to fasten it easily to the bark, is fixed under each cut. A little water is placed in each cup to prevent the milk from clotting. The contents of the cups are collected and brought into the factory, and the milk is

filtered through a metal sieve to free it from particles of bark, sand, &c., which would detract from its value. It is then poured into flat tin dishes to a depth of two inches, and treated with a small quantity of acetic acid, or often simply left to itself. By the next morning each dish contains a cake of rubber separated out from the watery part of the milk. This is removed, pressed with the hands to drive out the first excess of water contained in it, then passed under a wooden roller to squeeze out still more water, and finally dried on open canework trays, care being taken that mould is not allowed to form on the surface. The resulting "biscuits" are thin, clear, and translucent. They are packed in boxes containing about 100 lb. for export.

RUBBER PREPARATION.

Though it is only a short time since this rubber began to appear on the London market, it has already established itself at the top, on account of its cleanliness and freedom from impurity or adulteration; in the washing process it loses only about 1 per cent., whereas the best South American rubber loses at least five times as much. The trifling quantity of rubber that dries on the tree forms scrap, which sells at a lower price.

The exports of rubber (almost all Para) in 1903 were 41,798 lb., the average price in London being about $1·00.

Camphor.

Since the acquisition of Formosa by the Japanese and the formation of a camphor monopoly in Formosa and Japan the price of camphor has risen so much that there is a fair prospect of its cultivation proving remunerative. The Botanical Department introduced the plant into Ceylon, and found that it grew well in suitable localities and that good camphor could be obtained by distillation of the twigs and young leaves, so that a return might be obtained in three years. Several planters have already taken it up, and a small area is planted in it, which seems likely to increase.

Gums and Resins.

Many trees in Ceylon, native and introduced, yield more or less gum, but in no case of very good quality. Several local resins, on the other hand, yielded by trees of the Dipterocarp family, are of good quality for varnish making and other purposes.

COLOMBO JETTY AND GRAND ORIENTAL HOTEL.

CHAPTER VI.

FORESTRY.

BY

F. LEWIS, F.L.S., Assistant Conservator of Forests, Ceylon.

OUT of the Island's total area of 25,365 square miles—the natural features have been described in the introductory chapter—the extent of uncultivated land is about 20,000, but it must not be supposed that this vast extent is composed of forest, as enormous stretches are covered with grass land, locally known as *talawas* and *patanas*, besides huge expanses of scrub bush. The actual extent of true forest in Ceylon is probably hardly one-half of its uncultivated area, and this is not in a connected form or situated in one particular part of the country, but is composed of masses scattered all through the Island.

Up to the end of 1901, for purposes of forest administration, 103 forests were proclaimed as reserved or specially protected, giving an acreage of 713,413 acres, or nearly 1,115 square miles, or about one-eighteenth of the estimated uncultivated area of the country.

The peculiar situation of the Island and extreme variation of rainfall and altitude within its comparatively small limits produce remarkable differences in the forest vegetation,

that may be said to occupy five distinct zones, namely, the arid zone with a rainfall of 35 to 50 inches per annum; the dry zone, 50 to 70 inches rainfall; the intermediate zone, 70 to 80 inches; the wet zone, 80 to 300 inches; and the mountain zone.

Of these, the arid zone occupies two portions of the Island, one on the north-west and the second on the south-eastern extremity of the country.

The dry zone forms a wide belt from the west right across Ceylon to the north and east, passing along the south-east and terminating in the south. This zone alone absorbs about three-fifths of the country.

The intermediate zone follows in the form of a rough horseshoe, nearly surrounding the wet and mountain zones, which last occupy the south-western portion of Ceylon.

WET ZONE VEGETATION.

The wettest part of the Island is in the neighbourhood of Adam's Peak, where the rainfall has been reported to exceed 350 inches in the year. Instances of over 12 inches of rain

falling in twenty-four hours are by no means uncommon, while one case is recorded of *over 31 inches* being registered in a day!

With such climatic variations correspondingly wide differences in the character of the forest are the consequence. Pure forests, or forests entirely of one species, are unknown in the country, and though several species occur gregariously, yet in no part of the country do they constitute large and unbroken areas, thus rendering the work of the forester one of no little difficulty where his aim is to obtain a large supply of a given kind.

Each zone, however, may be said to possess its characteristic types of flora, notwithstanding the enormous mass of species that go to build up the forest vegetation of Ceylon. Taking them in their order, the typical species in each zone may be briefly described.

Arid Zone.—Typical species: Salvadora persica, Acacia planifrons, Randia dumetorum, Zizyphus Jujuba, Z. rugosa, and Tribulus terrestris.

The Dry Zone.—Typical species: Cratæva Roxburghii, Cassia fistula, Mimusops hexandra, Chloroxylon Swietenia (satinwood), Diospyros Ebenum (ebony), Berrya Ammonilla (Trincomalee wood), Polyalthia longifolia, Schleichera trijuja, Adina cordifolia, Gyrocarpus Jacquini, Strychnos Nux-vomica, Euphorbia antiquorum, Hemicyclia sepiaria, besides very many characteristic shrubs and a few ferns.

The Intermediate Zone.—Typical species: Albizzia odoratissima, Holoptelea integrifolia, Tetrameles nudiflora, and frequently species that extend into the dry zone.

The Wet Zone.—Typical species: Wormia triquetra, Garcinia terpnophylla, Vateria acuminata, Vatica Roxburghiana, Dipterocarpus zeylanicus, Shorea Oblongifolia, Elæocarpus serratus, Euodia Roxburghiana, Campnosperma zeylanicum, Pericopsis Mooniana, Anisophyllea zeylanica, Palaquium grandis, P. petiolare, Diospyros Gardneri, Myristica laurifolia, M. Horsfieldia, Machilus macrantha, Glochidion zeylanicum, besides numbers of grasses, shrubs, and orchids, of which last Dendrobium macarthiæ is perhaps the finest and most representative.

The Mountain Zone.—Typical species: Michelia nilagirica, Calophyllum Walkeri, Gordonia zeylanica, Elæocarpus serratus, Rhodomyrtus tomentosa, several of the Styraceæ, Rhododendron arboreum, besides many Rubiaceous shrubs, are distinctly characteristic of the high altitude, quite apart from the more vivid colouring of mountain flowers.

The limits of this brief review admit only of a general description of the forest flora of the country, without any

attempt at detail as to species. According to the latest published Flora of Ceylon,* exclusive of importations of

A GLEN.

recent years and ferns, mosses, &c., the flowering plants of the Island form 149 orders, representing 1,017 genera, and

*A Handbook of the Flora of Ceylon, by Henry Trimen, M.B., F.R.S., late Director of Botanical Gardens, Ceylon. London, Dulau & Co., 1893-1900, in 5 volumes.

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about 2,762 species, of which comparatively few come into actual use in forestry. Of this large number of species about 745 are endemic, or nearly 27 per cent. of the total. The distribution of useful trees and plants is, however, small, as out of 2,762 species only 250 come into use in forestry apart from fuel supply; 310 find their way into food and medicinal use; 63 in arts or commercial purposes; and 103 in agricultural work and religious rites.

A LIANA (WOODY CLIMBER).

Of the 149 natural orders, those richest in genera and species are: first, the Grasses, which embrace 237 species in 81 genera; next, the Leguminoseæ with its army of 207 species and 64 genera; followed by the Orchideæ, which is represented by 61 genera and 160 species; while the Rubiaceæ with its 47 genera and 138 species brings up a large fourth.

In forestry the most valuable orders in Ceylon are the Meliaceæ, Dipterocarpaceæ, and Ebenaceæ, these yielding ornamental, cabinet, and building timbers in large proportion.

It will be seen from the foregoing that, notwithstanding the enormous mass of plants inhabiting Ceylon, only a small proportion come into use, but at the same time it must be admitted that our knowledge of the medicinal and other properties of the Island's plants is by no means completely known.

In 1885 an Ordinance was passed by the Legislative Council of Ceylon known as the Forest Ordinance, and with its introduction forest administration in the country practically took a regular systematic form. Previous to the date of this enactment a vast amount of valuable timber was exported from the Island in the form of ebony, satinwood, Trincomalee wood, and ironwood, beside many other species.

ELEPHANT AT WORK.

From 1862 to 1881 445,450 cwt. of ebony were exported, of which China took 184,345 cwt., India 44,455 cwt., Europe and America 216,650 cwt.

The total *declared* value of this mass of one purely ornamental wood amounted to Rs. 2,066,482. Of satinwood, for the same period (1862 to 1881) the declared value of the export amounted to Rs. 397,661, of which Europe and America did not take so large a proportion as in the case of ebony.

In Trincomalee wood timber to the value of Rs. 318,388 was taken out of the country, while in ironwood and other

unclassed woods the Colony exported during the period in question Rs. 1,566,846 worth to various parts of the world.

This enormous exploitation of timber by untrained timber men led to the careful consideration of the conservation and systematic working of our forests, and to that end in 1887 serious attempts were made by the Ceylon Government, following an exhaustive and deeply scientific report on the "Conservation and Administration of Crown Forests" by Mr. F. D. A. Vincent of the Indian Forest Service.

As far back as 1873 Sir Joseph D. Hooker pressed upon the then Secretary of State for the Colonies (Lord Kimberley)

FOREST BRIDGE.

the importance of protecting the hill country from further denudation of forest, and the forests themselves from loss of valuable woods, so that to him is due the primary initiation of the steps that followed. It was but natural that the different Governors of Ceylon should push forward the development of agricultural enterprise in Ceylon, and it followed in consequence of this policy that between 1855 and 1895 land to the extent of 1,116,411 acres was sold to various purchasers. Large as this extent undoubtedly is, it is probably considerably below the area cultivated in a desultory way by the native inhabitants of the country—a

form of culture, generally speaking, disastrous to the forests and soil and prolific in causes of litigation as to ownership—thus tending still further to shrink the forest area to its present proportions.

MOUNTAIN FOREST SCENE.

Following the organization of the Forest Department in Ceylon, restrictions were placed upon the wholesale exploitation of the Colony's most valuable woods, but the actual value realized by sale of forest produce is best expressed by the following table, which indicates the revenue by sale of forest produce during fourteen years :—

Table of Forest Revenue for Fourteen Years.

	Rs.		Rs.		Rs.
1888 ...	224,500	1893 ...	360,595	1898 ...	500,219
1889 ...	325,920	1894 ...	378,250	1899 ...	486,420
1890 ...	501,816	1895 ...	413,361	1900 ...	383,179
1891 ...	374,450	1896 ...	465,264	1901 ...	369,627
1892 ...	458,003	1897 ...	477,871		

Total ... Rs. 5,719,475

Para rubber was introduced into Ceylon, through the energy and interest of the Royal Botanical Gardens at Kew, in the year 1876, and at the present date it is estimated that about 12,000 acres are planted with this valuable product.

The prices obtained for Ceylon-grown Para rubber are most favourable to the enterprise, as much as 4*s.* 10*d.* a pound having been paid for it, while a careful and judicious selection of suitable land for its culture will still admit of a very considerable development of the rubber industry in the country (see p. 100).

In tanning barks and galls the trade of Ceylon is capable of still further development, notwithstanding the no inconsiderable export of both these items of Colonial produce.

The produce of the cocoanut palm—nowhere wild in the country—represents one of the most important items of the Colony's productions, the value of exported matter in 1897 having reached Rs. 13,142,621, obtained from an estimated area of 878,000 acres planted with this tropical plant, that was said to have been introduced into Ceylon about the year 564 A.D. by King Agrabodhi, and planted somewhere in the South of the Island.

COCOANUT PALM.

The manufacture of fibres from plants native to or growing wild in the country has perhaps not received as full attention as the subject deserves, owing to the difficulty in cheap manufacture and competition against the produce of cultivated fibre-yielding plants. The so-called "bristle fibre," largely used in the manufacture of brooms and brushes, the product of one of our palms—the *Caryota urens*, or Toddy Palm—is largely exported, though it has no comparison with the amount exported of cocoanut fibre in the form of yarn and rope. Many Ceylon plants belonging to the orders Malvaceæ, Asclepiadeæ, and Urticaceæ, apart from the plantain, afford excellent fibres, and await improvement in mechanical design in order to secure their use in commerce.

Ceylon's Forestry Exhibit.

The exhibit of Ceylon woods is divided into three sections, viz. :—

(i.) A large case cut out of a single satinwood tree, containing within it a library of wood samples, representative of the more useful timbers found commonly in the country. These include both ornamental as well as building timbers, while the enclosing solid case affords a typical example of the famous satinwood so widely used in cabinet work both locally and in Europe. The case stands on another ornamental wood, ebony, for which Ceylon is justly famous.

(ii.) A group of six panels of woods, used both in structural as well as in carved work.

(iii.) A group of wood blocks, illustrative of our common dry-zone timber trees.

While the examples given by no means represent more than a fraction of Ceylon's timber produce, they are selected as representing the more useful species in common use by the Island's inhabitants.

WATERFALL.

ELEPHANTS IN STREAM.

CHAPTER VII.

FISH AND GAME.

Sketch of tho Animal Life of Ceylon.

BY

A. WILLEY, D.Sc., F.R.S., Director of the Colombo Museum.

THE natural history of Ceylon, as of every other circumscribed area, comprises the study of the commonwealth of life upon the Island, of the conditions under which the numerous communities of animals and of plants exist severally and relatively to each other and to man, whether at peace or war, as allies, enemies or guests, as permanent residents, seasonal migrants, or occasional visitors.

What is aimed at here is merely the presentation of a rough outline of a portion of the animal kingdom, more particularly of the Mammalian Class of the Vertebrate sub-kingdom, according as it manifests itself in Ceylon, for the information of such sportsmen, field naturalists, and collectors as are not already acquainted with what this country has to offer for their amusement.

To a very large extent, especially from the point of view of the hunter after big game, the animal life of Ceylon is an abridged edition of that of India, since practically all the furred game of Ceylon is met with on the neighbouring continent, though many Indian mammals, such as antelopes and tigers, do not cross Palk's Strait. The absence of the royal tiger from Ceylon is a significant fact of distribution, because individuals are occasionally shot in the much smaller island of Singapore

It would not be correct to suppose that the fauna of Ceylon is nothing more than an impoverished Indian fauna. The matter is by no means so simple when the lower orders are taken into consideration. It seems quite clear that while many of the continental species crossed over to Ceylon at a period when this Island was united to Southern India by a former land connection, many other species have arrived here by very different routes. In other words, Ceylon is to be regarded as a zoogeographical province *sui generis*, possessing its own distinctive features and interests.

With the economic progress of the Island during recent times, the increase of cultivation, the development of railways, and the exploits of sportsmen, the herds of game in many districts have been numerically reduced and have taken refuge in the remoter jungles. Nevertheless game is still plentiful in some of the Provinces. In the Eastern Province, for example in the neighbourhood of Trincomalee, "elephants, buffaloes, sambur, spotted and red deer, and pea-fowl are met in almost every jungle throughout the district."*

Moreover, the establishment of sanctuaries and close seasons has checked the wholesale destruction of life, and the time is happily still far distant when the wild attractions of Ceylon will be no more than memories. In the sanctuary at Yala, in the Southern Province,† nature, though "red in tooth and claw," holds undisputed sway, and here is a veritable paradise for forest denizens and forest lovers.

Even now it is found necessary to offer rewards in some districts for the destruction of leopards and bears, and we are told, for example, that in 1901 payments were made for the destruction of ten leopards and three bears in the Jaffna District, "but since more is paid by traders for skins than can be obtained in the official reward, the figures in no way represent the actual killing of these animals."‡

No doubt civilization tends towards the extermination of the Carnivora; and the disappearance of the leopard and the bear from Ceylon would perhaps be considered as great a sign of progress as that of the wolf and the highwayman from England. But the cubs of these creatures are remarkably playful and fascinating.

It is well known that the different species of mammals, the fur-bearing, milk-producing animals, exhibit a marked tendency to segregate into family groups, which often display

* Lushington, C. M., Report on the Trincomalee District for 1901 (Ceylon Administration Reports, 1901).

† *Cf.* Fowler, G. M., Administration Reports, Southern Province, 1900 and 1901.

‡ Ievers, R. W., Administration Report, Northern Province, 1901.

ELEPHANT KRAALING.

Photo by Plâté & Co.

as great a range of variation as do the races of mankind. In Ceylon, not only is it possible in many cases to distinguish between the low-country and the up-country members of the same species, but it is said that the individuals of a single herd will often bear some perceptible hereditary brand. In an interesting and useful guide to "Sport in the Low-Country of Ceylon," by Mr. Alfred Clark of the Forest Department (Colombo, 1901, A. M. & J. Ferguson), we are told that "the old head clerk of the Mannar Kachcheri, who had measured scores of elephants brought there for shipment to India, claimed, and with justice, that he could tell at a glance whether any elephants brought up came from the Northern, Eastern, or Southern Province." Information on these points is generally vague, the characters themselves are often so subtle as to render description difficult, and the analysis of specific characters has not yet been carried to such a degree of refinement here as in Europe and America. There is consequently some uncertainty as to the exact limits of a given species, both as between members from different localities in Ceylon and also between the Ceylonese and Indian representatives of a given type.

SNAKE CHARMER.

Thus, with regard to the Ceylonese monkeys of the genus *Semnopithecus*, it has been pointed out that *S. cephalopterus* and *S. ursinus* are closely allied to *S. johnii* of the Nilgiris, and "whether or not they are to be regarded as distinct species, or only local races of one and the same species, depends solely on the meaning attached to the term species."*

The following table contains a list of the mammals hitherto recorded from Ceylon, chiefly compiled from Dr. W. T. Blanford's work on Mammalia (1888–1891) in the "Fauna of British India, including Ceylon and Burma."

* Anderson, J., "Anatomical and Zoological Researches," London, 1878, p. 24.

MAMMALS OF CEYLON.

Order and Family or Sub-Family.	Name.	English.	Sinhalese.	Remarks.
PRIMATES.				
CERCOPITHECINÆ (with cheek-pouches).	1 *Macacus pileatus*	Toque monkey	Rilawá	Dr. Blanford states that this macaque and *M. sinicus*, the common monkey of Southern India, a.e probably varieties of the same species. It is "carried about by jugglers and itinerant mountebanks........exactly as *M. rhesus* is in Northern India and *M. sinicus* in Southern India."
SEMNOPITHECINÆ (without cheek-pouches).	2 *Semnopithecus priamus*	Madras langur	Koṇde-wañdurá (crested wanderoo)	Northern Ceylon, extending south as far as Trincomalee and the skirts of the Kandyan hills (Blanford).
	3 *S. cephalopterus*	Purple-faced monkey	Kalu-wañdurá (black wanderoo)	The common monkey of the maritime districts.
	4 *S. senex*	White monkey	—	Probably a white variety of *S. ursinus* or *S. cephalopterus*.
	5 *S. ursinus*	Bear monkey	Maha-wañdurá (great wanderoo)	Said to occur especially near Nuwara Eliya.
LEMURIDÆ.	6 *Loris gracilis*	Ceylon sloth	Unahapuḷuwá	A tailless lemur of arboreal and nocturnal habits living in the forests of the low-country and Central Province.

CARNIVORA. FELIDÆ.	7 *Felis pardus*	Leopard or panther	Koṭiyá (female, koṭidena)	The cheetah, or hunting leopard, *Cynælurus jubatus*, does not occur in Ceylon.
	8 *F. viverrina*	Fishing cat	Hañdun diviyá	Locally known as the large tiger-cat.
	9 *F. rubiginosa*	Rusty spotted cat	Kuḷá-diviya (wild cat)	Smaller than the domestic cat.
	10 *F. chaus*	Jungle cat	—	This is the common wild cat of India, but is rarely met with in Ceylon.
VIVERRIDÆ.	11 *Viverricula malaccensis*	Small Indian civet	Uruḷẹwá	—
	12 *Paradoxurus niger*	Indian palm civet	Uguduwá	Frequents the roofs of bungalows even in Colombo; sometimes called locally the Ceylon polecat.
	13 *P. aureus*	Ceylonese palm civet	Hótambuwá	Generally distributed, but less common than *P. niger*; it is sometimes called the golden paradoxure.
	14 *Herpestes mungo*	Indian mungoose	Mugatiyá	Very common in jungles and villages; frequently seen running across the roads. "It lives and breeds in holes dug by itself" (Blanford).
	15 *H. smithi*	Ruddy mungoose	Hótambuwá	The Sinhalese term is applied indifferently to the golden paradoxure and to the red mungoose.
	16 *H. fulvescens*	Ceylon brown mungoose	Ran-mugatiyá (golden mungoose)	Probably a variety of *H. fuscus* of the Nilgiris.
	17 *H. vitticollis*	Stripe-necked mungoose	Loku-mugatiyá (large mungoose)	Locally called the Ceylon badger.

MAMMALS OF CEYLON—*contd.*

Order and Family or Sub-Family.	Name.	English.	Sinhalese.	Remarks.
CANIDÆ.	18 *Canis aureus*	Jackal	Nariyá	The jackal has approximately as wide a range in the Old World as the leopard.
MUSTELIDÆ.	19 *Mustela flavigula*	Indian marten	—	Jerdon ("Mammals of India," 1874, p. 82) says this species occurs in Ceylon, and I have heard a rumour of its occurrence in the Balangoda district. There is no specimen in the Colombo Museum.
LUTRINÆ.	20 *Lutra nair*	Indian otter	Diya-ballá (water dog)	According to Dr. Blanford the Indian otter is co-specific with the common otter, *L. vulgaris*, which ranges throughout the Palæarctic region.
	21 *L. leptonyx*	Clawless otter	—	Dr. Blanford thinks it possible that the otter of Nuwara Eliya may belong to this species.
URSIDÆ.	22 *Melursus ursinus*	Sloth bear	Walahá (the female bear is called Welahinna)	The sloth bear feeds upon fruit, insects, and honey. When it attacks human beings in self-defence it is in the habit of mauling the face and head of its victim with its claws.

INSECTIVORA.				
ERINACEIDÆ.	23 *Erinaceus* sp.?	Hedgehog	—	It is not yet known whether there is a species of hedgehogs indigenous to Ceylon. A specimen was recently found near Colombo and is at present living at the Colombo Museum, but its authenticity is doubtful. It apparently differs in some of its characters.
SORICIDÆ.	24 *Crocidura murina*	Brown musk shrew	Hikmíyá	Recorded from the Kandyan District.
	25 *C. cærulea*	Gray musk shrew	Hikmíyá	Common in the compounds of bungalows at Colombo. It is frequently called the "musk rat."
	26 *C. macropus*	Long-clawed shrew	—	From Nuwara Eliya; also recorded from the Palni Hills in Southern India.
	27 *C. horsfieldi*	Horsfield's shrew	—	From Peradeniya; it differs from the other species in having sixteen upper teeth in place of eighteen.
CHIROPTERA.				
PTEROPODIDÆ (fruit bats).	28 *Pteropus medius*	Indian fruit bat or flying fox	Má-wawulá	The fruit bats forage during the day and frequent certain trees at night, to the branches of which they suspend themselves to rest, large flocks roosting in the same trees night after night.

MAMMALS OF CEYLON—*contd.*

Order and Family or Sub-Family.	Name.	English.	Sinhalese.	Remarks.
	29 *Xantharpyia amplexicaudata*	Fulvous fruit bat -	Wawulá (general term for bats)	This is a cave-haunting fruit bat, occurring in great numbers about rock temples and old forts; *e.g.*, there is a large family of them in the old Dutch fort at Kalpitiya.
	30 *Cynopterus marginatus*	Short-nosed fruit bat	do. -	—
RHINOLOPHIDÆ.	31 *Rhinolophus luctus*	The great Eastern horseshoe bat	do. -	An up-country or highland species.
	32 *R. affinis* -	The allied horseshoe bat	do. -	—
	33 *Hipposiderus diadema*	The large Malay leaf-nosed bat	do. -	—
	34 *H. galeritus* -	Cantor's leaf-nosed bat	do. -	—
	35 *H. speoris* -	Schneider's leaf-nosed bat	do. -	Frequents the old fort at Kalpitiya, but not in the same dungeons with *Xantharpyia amplexicaudata.*
	36 *H. bicolor* -	The bicoloured leaf-nosed bat	do. -	—

NYCTERIDÆ.	37 *Megaderma lyra*	Indian vampire bat	Wawulá (general term for bats)	Occurs about buildings in Colombo. It is said to feed upon frogs, smaller bats, and on insects, never on toads (Blanford).
	38 *M. spasma*	Malay vampire bat	do.	A highland species.
VESPERTILIONIDÆ.	39 *Vesperugo noctula*	The noctule bat	do.	Recorded from Ceylon at the British Museum.
	40 *V. ceylonicus*	Kelaart's bat	do.	From Ceylon and the Malabar Coast of India.
	41 *V. abramus*	Indian pipistrelle	do.	A common house bat.
	42 *V. tickelli*	Tickell's bat	do.	—
	43 *Nycticejus kuhli*	Common yellow bat	do.	—
	44 *Harpyiocephalus cyclotis*	Round-eared tube-nosed bat	—	Dr. Blanford says (*op. cit.*, p. 327):—"A purchased specimen in the British Museum is said, apparently on fair authority, to be from Ceylon. All the other known examples are from the Sikhim Himalayas."
	45 *Vespertilio muricola*	The mustachioed bat	—	—
	46 *Cerivoula picta*	The painted bat	Kehel-wawulá (plantain bat)	—
	47 *C. hardwickii*	Hardwicke's bat	—	—
	48 *C papillosa*	The papillose bat	—	Its occurrence in Ceylon is doubtful.
	49 *Miniopterus schreibersi*	Long-winged bat	—	—
EMBALLONURIDÆ.	50 *Taphozous longimanus*	Long-armed sheath-tailed bat	—	—
	51 *T. saccolæmus*	Pouch-bearing sheath-tailed bat	—	—

MAMMALS OF CEYLON—*contd.*

Order and Family or Sub-Family.	Name.	English.	Sinhalese.	Remarks.
RODENTIA.				
SCIURIDÆ (squirrels).	52 *Pteromys oral*	Large brown flying squirrel	Hambáwá	The flying squirrel has approximately the same general distribution throughout India, Burma, and Ceylon as the flying fox (*Pteropus medius*), and inhabits the same districts, but is not gregarious. It is also frugivorous and nocturnal. It rests in the ordinary attitudes of arboreal mammals, but does not suspend itself like a bat.
	53 *Sciuropterus fuscicapillus*	Small Travancore flying squirrel	—	Recorded from the hills of Travancore and Ceylon, but must be either exceedingly rare or retiring in the latter country, as it is unknown to naturalists now living in the Island.
	54 *Sciurus macrurus*	Grizzled Indian squirrel	Daňḍuléná (sometimes called rukiya)	Locally known as the rock squirrel, probably owing to corruption of the Sinhalese word "ruk," meaning trees, though not generally used in the low-country, where the colloquial term for trees is "gas."

	55	*Sc. palmarum*	Palm squirrel	Léná	The small striped squirrel very common in Colombo.
	56	*Sc. tristriatus*	Jungle striped squirrel	do.	Dr. Blanford doubts whether this species is distinct from *Sc. palmarum*, which he thinks may be a semi-domesticated variety.
	57	*Sc. layardi*	Layard's striped squirrel	do.	Perhaps a variety of the preceding (Blanford).
	58	*Sc. sublineatus*	Dusky striped squirrel	do.	Recorded from elevations of 3,000 ft. and upwards.
MURIDÆ.	59	*Gerbillus indicus*	Indian gerbille or antelope rat	Wẹlimíyá (field rat)	One was caught alive in the grounds of the Colombo Museum in December, 1902.
	60	*Vandeleuria oleracea*	Long-tailed tree mouse	—	Recorded from Ceylon.
	61	*Mus rattus*, var. *rufescens*	Common Indian rat	Gas-míyá (tree rat)	The representative of the European black rat (kalu-míyá), which has also been introduced by shipping
	62	*Mus decumanus*	Brown rat	Gewal-míyá (house rat)	An introduced species in all parts of the world except Chinese Mongolia, where it is said to be indigenous (Blanford).
	63	*M. musculus*	Common house mouse	Kosẹṭa-miyá	Cosmopolitan.
	64	*M. buduga*	Indian field mouse	—	Found by Kelaart in houses at Trincomalee.
	65	*M. platythrix*	The leggyade or brown spriny mouse	—	Recorded from Ceylon.

MAMMALS OF CEYLON—*contd.*

Order and Family or Sub-Family.	Name.	English.	Sinhalese.	Remarks.
MURIDÆ—*contd.*	66 *Nesocia bengalensis*	Indian mole rat	—	According to Kelaart this short-tailed rat is very abundant in grass lands near Kandy and also in stable yards in Kandy.
	67 *N. bandicota*	Bandicoot rat or pig rat	Uru-míyá or ura-miya	Found in all parts of the Island, from the sea level to the elevation of Nuwara Eliya. It is a very large rat, exceeding a foot in length exclusive of the tail.
	68 *Golunda ellioti*	Indian bush rat	Kopiwatta-miyá (coffee estate rat)	Formerly destructive to coffee trees, more than 1,000 having been killed on one estate in a day during a periodic visitation (Kelaart, E. F., "Prodromus Faunæ Zeylanicæ," 1852, p. 67.)
HYSTRICIDÆ.	69 *Hystrix leucura*	Indian crested porcupine	Ittẹwá	Generally distributed throughout the Island.
LEPORIDÆ.	70 *Lepus nigricollis*	Black-naped hare	Háwá	Kelaart says the Nuwara Eliya hare is larger than the low-country animal.

PROBOSCIDEA. ELEPHANTIDÆ.	71 *Elephas maximus*	Indian elephant -	Aliyá -	Tuskers are rarely met with in Ceylon; they are called "Eṭu." The tusks are usually represented by short tushes, which also occur in a more or less rudimentary condition in the female.
UNGULATA. BOVIDÆ.	72 *Bos bubalus* -	The buffalo -	Wal-mímá or kuḷu-mimá (wild buffalo)	The domesticated buffalo is called mí-haraká.
CERVIDÆ.	73 *Cervulus muntjac*	The muntjac or rib-faced barking deer	Wẹli-muwa -	Known to local sportsmen as the red deer of Ceylon; it is said to be very common about Nuwara Eliya and the Horton Plains, and it also occurs in the low-country.
	74 *Cervus unicolor* -	The sambur or rusa deer	Góná -	Known to sportsmen as the Ceylon elk; it is met with singly or in small parties, but not in large herds, in the lowlands and highlands.
	75 *Cervus axis* -	The axis or spotted deer	Tic-muwa -	Occurs in large herds where there is suitable jungle and plenty of water.
	76 *Cervus porcinus* -	The hog deer -	Vil-muwa -	Also known as the paddy field deer, since it occurs in cultivated districts of the Western Province where no primitive jungle exists any longer; it is said to have been introduced into the Kalutara District during the Dutch administration of the Island; its home is in the Indo-Gangetic plain.

MAMMALS OF CEYLON—*contd.*

Order and Family or Sub-Family.	Name.	English.	Sinhalese.	Remarks.
TRAGULIDÆ.	77 *Tragulus meminna*	Indian chevrotain or mouse deer	Míminná or walmíyá	Hornless deer of very small size, ten to twelve inches high at the shoulder; the villagers drive them like hares into snare nets.
SUIDÆ.	78 *Sus cristatus*	The wild boar	Wal-úrá (wild pig)	Closely allied to the European wild boar, *S. scrofa*, from which it differs by its larger crest or mane and by the greater size and complexity of the last molar in each jaw (Blanford).
EDENTATA.				
MANIDÆ.	79 *Manis pentadactyla*	Pangolin or scaly ant eater	Kaballęwá	The pangolin lives in burrows which it digs by means of its powerful fore claws, leaving them at nightfall to forage for white ants. When sleeping it is rolled up tightly with the head tucked under the abdomen and covered by the stout tail. A special bony process of the sternum protects the viscera during the involution of the body.

PEACOCKS, FLAMINGOES, AND OTHER WADERS.

Photo by Skeen & Co.

The **Aquatic Mammalia**—whales, dolphins, porpoises, and dugongs—have been omitted from the foregoing list. Whales have been occasionally stranded on the coast of Ceylon, and a skeleton of a whalebone whale (*Balænoptera*) taken at Ambalangoda in 1894 is preserved in the Colombo Museum. The dugong, *Halicore dugong*, occurs off the north-west coast of Ceylon near Jaffna and Mannar. Kelaart says that he saw shoals of them on the coast of Arippu during the pearl fishery of 1835 and 1836. It is called múdu-úrá or sea pig.

The **Avian Fauna** of Ceylon comprises a rich assortment of songsters, game birds, waterfowl, and birds of prey. The chief of the feathered creation in Ceylon is the peafowl or moṇará (*Pavo cristatus*), which feeds and nests upon the ground but roosts in the topmost branches of the forest trees. Like the flamingo, it is a difficult bird to stalk. The fledgeling peacock bears a singular resemblance to a partridge.

Flamingoes visit Ceylon in immense flocks during the north-east monsoon. They frequent the salt pans or "léwáya" in the Southern Province and in other parts of the Island, but they have not been known to breed here. The movements of a flock are remarkably concerted, and at the least alarm the entire multitude will take wing with one consent, rising like a pink cloud across the horizon.

Another bird which is more frequently heard than seen, and more often seen than shot, is the well-known Ceylon jungle fowl, *Gallus lafayettii*. The cock bird is called "wẹlikukuḷá," and the hen "wẹli-kikiḷi."

Reptiles and **Batrachia** are well represented in Ceylon, some species and even genera being peculiar to the Island. The largest reptiles are the crocodiles, monitors, and pythons, all of which are abundant. The batrachia do not usually tempt sportsmen, but to the biologist Ceylon is a classical locality for the legless scale-bearing salamander, *Ichthyophis glutinosus*.

Finally, the **Freshwater Fishes** of Ceylon should not be forgotten, since they are capable of affording much pastime to anglers and others. To one unaccustomed to such sights a novel sensation is experienced when one comes upon a fish (*Anabas scandens*) calmly walking along the side of the road. The tank fishes of the family Ophiocephalidæ are equally interesting in their way. The most important native game fish of Ceylon is the Indian mahseer, *Barbus tor*, one of the family of carps inhabiting up-country rivers.

FISH AND GAME.

(Continued.)

The Fishing Industries of Ceylon.

BY

JAMES HORNELL, Marine Biologist to the Ceylon Government.

THE fisheries of Ceylon at the present day are carried on, in the main, according to the primitive methods prescribed by the custom of bygone centuries; the trammels of the caste system do much to limit development. Little has yet been done to organize methods, to introduce improvements in the conduct of existing industries, or, until recently, to enlist the help of those scientific methods of control and culture which have proved so conspicuously successful in the United States in the improvement of old and in the creation of new fishing industries.

Yet, in spite of this absolute conservatism, the fisheries of the Island furnish very great supplies of excellent fish. Over seventy-four thousand of the population depend thereon for their livelihood. The great majority of the fishermen are Roman Catholics, especially among the Sinhalese. Comparatively few Buddhists of the Fisher caste follow this avocation now, but in the North and East a not inconsiderable number of Hindu Tamils and of Moormen (Island-born Mohammedans) are engaged in sea fishing and in pearl and chank diving.

Sea Fishing.—Within certain limits much ingenuity is displayed in the devising of nets and traps and in their manufacture, but everything is of the past—stereotyped and become immutable. Nothing in the way of dredges or trawls has been evolved; the lines and nets at present employed are similar to those in use generations ago. We find villagers of to-day capturing fish in precisely the same way as was described and figured in the middle of the seventeenth century by Robert Knox, an English sailor held captive for many years by the Kandyan king of that period.

Outrigger canoes are the favourite craft of the Sinhalese fishermen. In the larger ones these hardy men venture daily even so far as twenty miles from land in quest of the seer—most esteemed of Ceylon fishes—lining for it as fishers in English waters do for mackerel. These boats frequently attain a speed of eight knots in a favourable breeze, skimming lightly over the sea by the help of a single huge cotton sail. It is this brown-winged fleet which forms that picturesque vanguard of the Island so often met by incoming steamers long before the coast is clearly distinguishable. Frail looking as they are, they are remarkably safe in reality, and it is wonderful what heavy weather they take in their daily routine. Nothing save the breaking of the outrigger is to be feared, and that need not occur if ordinary prudence be observed.

On all the coasts a certain amount of fishing goes on the whole year round to satisfy the local demand for fresh fish. Besides this settled industry, much of which is in-shore fishing, a large number of boats change their fishing grounds periodically, working off the west and south coasts during the north-east monsoon, and migrating to the eastern districts when the turbulent swell of the south-west monsoon renders fishing difficult and less prosperous in the former localities.

Comparatively little fish curing or salting is carried on, notwithstanding that the Government has done much to encourage the industry by establishing fish-curing yards, where facilities are given curers to procure the necessary supplies of salt on favourable terms—a failure partly due to the supply of fish in the localities where some of these yards are established being inadequate to meet both the local demand for fresh fish and that of the curer. As a consequence the industry there languishes, as operations cannot be undertaken on a scale of magnitude sufficiently great to be profitable. More energy and capital than are at present available are required, and to be successful curers must work on a foundation of well thought out organization, aided by the utilization of modern and improved methods of sea fishing and of curing. Having relation to this question is the fact that "cured or salted fish" (from India chiefly) was imported in 1902 to the extent of 237,879 cwt. valued at Rs. 1,766,524, to which must be added Rs. 2,026,928 worth of dried fish from the Maldive Islands—a total of Rs. 3,793,452 ($1,264,484) worth of imported fish. Against this enormous import we have as offset the triviality of Rs. 17,706 worth of Ceylon cured fish exported during the same period.

A trade distinct from that of ordinary fish curing is the preparation for the Chinese market of dried sharks' fins. In this article an extensive trade is done in the Northern Province, less, however, in recent years than formerly. Thus the exports for the two years 1900 and 1901 were collectively but of the value of Rs. 26,528, as against Rs. 30,398 in 1891 and Rs. 27,353 in 1892. Last year, 1903, export amounted to Rs. 17,523.

Among the most valued of the fishes commonly taken are the seer (*Cybium guttatum*), a huge mackerel with flesh firm and white, mullet, sea-pike, bonitos, bream, sword-fish, and sharks, together with rays of many species, some of which often attain huge dimensions, fourteen feet from margin to margin across the body being recorded. Immense shoals of sardines and of "whitebait" frequent the coast at periodical seasons, and are caught sometimes by means of large seines, sometimes by means of the throw or casting net.

Other "fish" sent to market comprise turtle, dugong, crawfish (locally known as lobster), and a variety of prawns and crabs.

Turtles are taken chiefly in the neighbourhood of Hambantota in the south and in the waters of the Jaffna peninsula in the north. The usual modes of capture are either by means of large nets or by the use of a rude but effective harpoon.

The Mannar District occasionally supplies dugong, which resort to the warm shallows of that locality to feed upon the abounding sea grass.

Crabs and crawfish of excellent quality are taken locally in some abundance in net traps of peculiar construction, differing utterly from the European idea of wicker lobster traps. A number of these when baited and placed in position are kept continuously in view by the fisherman, who hauls up to examine whenever the agitation of a float signals interference with the bait.

On rocky parts of the coast the swiftly scurrying rock-crabs may sometimes be seen captured for bait by men using a tiny noose formed of a single coir fibre adjusted upon the slender tip of a fishing rod made from the highly elastic midrib of a leaf of the kitul palm. Cautiously the angler stalks his prey; when the crab is within striking distance the noose descends silently, the crab not really alarmed puts up an inquiring claw, whereon the noose slips suddenly, and lo! the crab is swung through the air into the fisher's hand.

Another rare form of angling is practised at Galle. There shoals of small fish so abound at times that crowds of men

and boys armed with rods wade into the lagoon, and may often be seen hauling forth several fish a minute, even a couple at a time, without the superfluity of using a bait. A line armed with a naked hook is all-sufficient when flicked among a shoal with that skill which comes of practice.

Although wicker traps are not used for catching crabs, such are in common use for taking the smaller fishes, both in the sea and in rivers. Three forms of fish traps are exhibited, together with two patterns of bottomless wicker baskets employed to capture fish upon flooded land—often in paddy fields—when the waters begin to subside.

Pearl Fishing.

The pearl fishery is an historic industry in Ceylon, and around it centre legendary stories innumerable. A source of treasure, of tribute, and of trouble, historians have occasion to refer to it continually; poets, Tamil as well as Sinhalese, employ it in their imagery. Ceylon, in the exuberant phraseology of the Orient, is "the pearl drop on India's brow"; the Gulf of Mannar is "the sea abounding in pearls" and "the sea of gain."

Pearls and gems brought the Phœnicians coasting hither at regular seasons; the Romans and Levantine Greeks succeeding them as traders, continued the commerce, to be ousted in turn by the Arabs. These, a race of born traders and intrepid adventurers, long held the command of the Eastern seas, down indeed to the beginning of the sixteenth century, when the superior energy and audacity of the Portuguese, brought on the scene by Vasco de Gama's great achievement, put an end to Arab maritime supremacy, and brought the influence of European civilization to bear intimately upon Ceylon. Thus the control of the pearl fishery passed into European hands, and therein has remained—the Dutch succeeding the Portuguese, the English in turn taking over the management in 1796.

The earliest historical reference to the Ceylon pearl fisheries is probably that contained in the great Sinhalese national record, the *Mahawansa*, wherein it is recorded that King Wijayo, who reigned about 550 B.C., sent his father-in-law gifts of chanks and pearls to the value of two lacs of rupees (over $60,000).

Coming to the middle ages, we find the Arab traveller Ibn Batuta—whom I shrewdly suspect to have been a prototype of our old friend Sindbad the Sailor—in 1344 interviewing the Tamil king of the northern part of the Island at the close of a successful pearl fishery.

Greek geographers, Venetian and Chinese travellers, Portuguese, Dutch, and British officials, have all contributed their quota, and so the literature of this subject, scattered and polyglot, is as extensive as it is interesting. Till the advent of the Portuguese no detailed account of how the fishery was carried on is, however, available. Under their rule Mannar, the centre of the industry, waxed prosperous. She boasted extensive monasteries and sumptuous churches, but when the Dutch captured the town in 1658 its glory had departed consequent upon a long-continued failure of the fishery.

The Dutch had several series of good fisheries, but financially found the industry unprofitable owing to the oft recurrence of unproductive years.

Repeating the experience of the Dutch, the British had excellent pearl harvests during the first years of their occupation; as much as £310,000 was realized for the years 1796-98.

During the first thirty-seven years of the past century fisheries were fairly regular, the only great break being the seven unproductive years 1821-27. Subsequent to 1837 the series of fisheries become extremely erratic, and are overshadowed by the lean years. A fruitful series continued from 1855 to 1860, followed by the isolated fisheries of 1863, 1874, and 1877; then a two-years' series, 1880 and 1881, from which a gap of six years extends to the next series, a long one, 1887 to 1891, inclusive. 1891 was the last fishery of the nineteenth century, and it was but last year, 1903, that a resumption of the industry was possible, over 41 millions of oysters being then fished, bringing in to Government the sum of £54,431.

The value of the fisheries is very variable, ranging from the record of £105,187 in 1814 to a miserable £584 in the succeeding year. The quantity fished varies correspondingly, from 44 millions in 1891 to 636,000 in 1884. The average of the last ten fisheries is over 28 millions.

The pearl banks are situated towards the head of the Gulf of Mannar, off the north-west coast of the Island. They consist of a northern and a southern division. The former is constituted of a solid phalanx of beds 20 miles square, lying to the south of the island of Mannar; the latter, a long line of banks—"paars" as they are termed—fronting the coast from Kudiramali (the ancient Hippuros) in the north to Negombo in the south. They cover discontinuously an extensive submarine plateau which widens greatly at the northern end. The seaward face of this plateau forms a precipitous submarine cliff falling away suddenly from the 20-fathom line to several hundreds of fathoms. The bed of

the sea over this plateau-area is wonderfully level, the gradient of slope imperceptible to a diver walking on the bottom, less indeed than 7 feet in 10,000 over the northern section. The best beds are where a coarse grit sand is interspersed with frequent outcrops of flat-surfaced rock, or where many loose fragments of stone or of dead coral (technically termed " cultch ") are scattered extensively over the surface of the sand. In such situations the oysters do not become over-crowded, and with sufficiency of food come early to the pearl-producing stage.

Other banks have an exclusively rocky surface. These are often crowded with spat, but they seldom bring their oysters to profitable maturity, over-crowding producing stunting of growth, disease, and premature death.

The beds are examined by the Inspector of Pearl Banks twice each year, approximate estimates being made of the number of oysters present on each bank. Whenever the age and size of the pearl oysters appear to warrant the step, a sample of some 20,000 oysters is collected by native divers, and a valuation of the pearls they may yield is made. If over the value of Rs. 10 or Rs. 12 per 1,000 oysters a fishery is proclaimed by Government, and advertisements are published far and wide through India and Ceylon, detailing the valuation of the sample pearls, the area of the bed to be fished, and the estimated number of oysters likely to be available.

Divers and merchants are invited to attend, the former being offered the inducement of one-third share of the oysters fished as remuneration for their services. The divers provide the boats and everything necessary for the work.

The fishery takes place during the calm period of the north-east monsoon—February, March, and April—when rain seldom falls during the day, and when the divers can count, during the morning, upon a calm clear sea with a bright sky overhead. This period offers the further advantage of a land wind blowing throughout the night alternating with a sea breeze from about midday. The boats are thus enabled to take up their stations on the banks by daybreak and to regain the fishery camp at an early hour in the afternoon.

The fishing fleet is divided into two sections operating upon alternate days.

About 7 A.M. the signal to begin diving is given by the Inspector of Pearl Banks, who has charge of the diving operations. Immediately the scene becomes animated; divers take preliminary headers, and a tumult of noise

begins, incessant for the rest of the day. Matters soon settle down a little and work commences in earnest.

The divers are a motley crowd composed practically of four types only—Moormen or Mohammedan coast men of Ceylon and India, Tamils from Jaffna and the Madras Presidency, Malabars from the west coast of India, and finally a lusty gang of Arabs and Negro-Arab half-breeds from the Persian Gulf. With the exception of the Malabars, who dive in European fashion, head foremost from a spring board seat, the divers descend in an upright position helped in their descent by a stone of some 50 lb. in weight. Each diver has an attendant and is furnished with two ropes.

FLEET OF FISHING CANOES.

To the one is attached the sink-stone, to the other a wide-mouthed bag or basket. Stone and basket are lowered over the side, the former made fast to a projecting rail by means of a slip-knot; the diver, already in the water, places the basket upon the stone and one foot on either side. When ready to descend he takes a few deep breaths, and closing his nostrils with his fingers or, if an Arab, by means of a horn nose-clip, looses the slip-knot and sinks to the bottom, carried rapidly down by the stone.

The moment bottom is reached the diver gives a signal tug on one rope, seizes the basket, and begins to gather thereinto all oysters within sight. Meanwhile the attendant draws up the stone and adjusts it in position for the following dive. His air exhausted, the diver signals and is drawn up

as rapidly as possible, he himself often hastening the ascent by coming up the line hand over hand.

The length of time a diver can remain under water varies very considerably. As is natural, it depends largely upon physique. Thus the lusty deep-chested Arabs compass from 60 to even 85 seconds each time, whereas the lithe but weaker-built Tamils and Moors average not more than 40 to 45 seconds, many even less.

As a class divers do not seem to suffer unduly from the trying nature of their work, provided the depth does not exceed seven fathoms. Nine fathoms tells upon the weaker men ; at the last fishery at least five collapsed and two died, when a detached bed lying in this depth was being fished. Many of the men, however, live to as full a span as those pursuing other humble callings.

The organization of the fishery is in the hands of the Government Agent or chief revenue officer of the Northern Province. He it is who selects a site for the fishery camp at a convenient spot upon the desolate sandy shore of the Mannar District ; here he erects temporary buildings, walled and roofed with cadjans (mats made of the plaited leaves of the cocoanut), to serve as treasury, court-house, post office, police barracks, and hospitals, with such other offices as are necessary. He erects also an extensive series of storage sheds for the oysters, surrounded by a high palisade. He lays out the settlement with convenient roadways and sees to the provision of a sanitary staff and an adequate water supply, together with the hundred and one other requirements incidental to the control of a concourse of Oriental people that is likely to total not less than 30,000 if there be fair prospects of a good fishery.

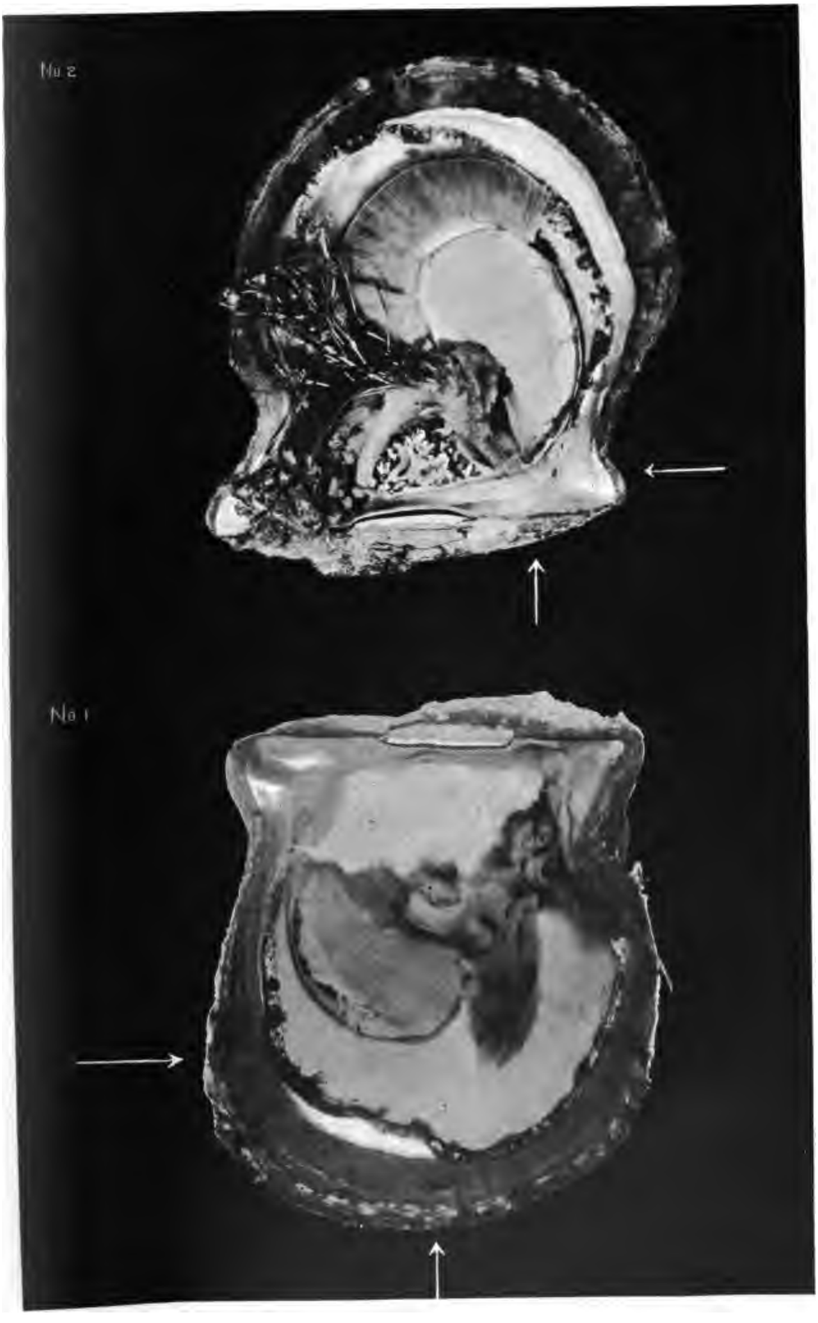
Streams of people converge on the camp towards the date appointed—the men directly concerned with the fishery, divers, boatmen, merchants, together with a myriad of petty traders and camp followers to supply their daily wants. Cadjan huts spring up in orderly rows as if by magic, and within a week the scrub-covered desert shore is transformed into a populous community where all the necessaries, and even some of the luxuries, of life are offered for sale. Life in the camp knows little rest save when the boats are out and in the dead of night. By 3 A.M. the fleet is under weigh, returning some twelve hours later. Cargoes are taken direct into the kuttu or storage enclosure, each boat's complement dividing their catch into three equal piles, two of which are selected by a Government official, the remainder belonging to the divers, who carry their oysters away to retail to the smaller buyers.

When the last boat is in, the Government share is counted and the number reported to the Government Agent, who puts the oysters up to auction in the evening, the unit of sale being one thousand. £2 per 1,000 is about the average price, but as low as 15*s*. 8*d*. is recorded, and in 1860 the phenomenal price of £12 17*s*. 10*d*. per 1,000 was obtained.

The processes of pearl extraction as hitherto practised are most tedious and offensive, as well as being primitive in the extreme. The universally accepted method is to allow the contents of the shells to putrefy and decay. The co-operation of flies is also sought, as it is found that the process

GOVERNMENT DIVERS PICKING OUT PEARLS FROM OYSTER WASHINGS.

of disintegration is greatly facilitated by the presence of multitudes of maggots. The lapse of a week or ten days suffices to render the contents putrid, which are then washed out, the water being decanted repeatedly till the maggots and floating filth be got rid of. The residue, consisting mainly of solid particles, is strained and dried, and eventually picked over time after time for the pearls that are mixed with it. The intensity of the noisome odour that pervades the camp when the fishery is in full swing may



DISSECTIONS OF THE PEARL OYSTER, SHOWING PEARLS *IN SITU.*

Photo by J. Hornell

better be imagined than described—a stench that defies exclusion or deodorization, and which is rendered all but insupportable by the accompanying plague of flies. Medical organization is, however, very thorough : all arrivals from India are subject to rigid scrutiny, and by this precaution, in conjunction with an efficient sanitary staff, the danger of epidemic disease is reduced to a minimum.

Pearls are classified according to size, shape, and lustre. For sizing a series of bowl-shaped sieves is employed, the holes graduated after a rather intricate formula. The pearls are next classed with regard to shape, due regard being given to the lustre or "skin." Herein is room for much diversity of opinion, valuers wrangling for hours before an assessment agreeable to all is arrived at. The final stage is then reached; each class of pearls is weighed in turn, the actual value being thereafter determined by reference to the market quotations of the day.

The irregularity and intermittence characteristic of Ceylon pearl fisheries, already referred to, have been the source of perennial disquiet to the Government. During the past century several inquiries were instituted; endless reasons for the recurring failures were adduced, but few remedies were suggested and none were adopted. So matters remained until the late Governor, Sir J. West Ridgeway, determined in 1901, after an intermittence of ten years in the pearling industry, to invoke the aid of biological science towards the elucidation of the problem. Professor W. A. Herdman, F.R.S., was approached, and eventually went to Ceylon in the beginning of 1902, accompanied by the writer, to investigate. As a result he recently furnished a voluminous report embracing conclusions based upon two years' work.

The chief of the harmful agencies was found to be the tendency of spat to fall upon unfavourable ground, where if exposed to the full violence of monsoon storms it is liable to be smothered by overwashes of sand; or where, if the ground is continuously rocky, the oysters eventually become stunted by the shortage of food induced by overcrowding. In the latter case the oysters are extremely likely to perish untimely by the inroads of disease, their tissues, weakened by semi-starvation, being unable to cope with disease organisms.

Among the chief remedies proposed are the transplantation of spat from unfavourable to favourable ground and the thinning out of overcrowded beds.

Another result of the investigation has been to determine the origin and causation of pearls in the Ceylon pearl oyster (*Margaritifera vulgaris*). The old idea of pearls being due

to the irritation caused by an intrusive grain of sand was proved untenable as a normal mode of pearl inducement, although, indeed, three instances of this sand origin of pearls were found among several hundred instances traced to other causes.

Two chief modes of origination were found, correlated respectively to two classes of pearls which can usually be determined and separated at sight by an expert. The one is the "Orient" or "fine" pearl of commerce; the other constitutes the bulk of those irregularly shaped and of those known as "seed pearls."

"Orient" pearls were discovered to be due to the irritation caused within the tissues of the pearl oyster by the presence of the dead bodies of the spherical larvæ of a small tapeworm (*Tetrarhynchus*) which frequently infests the Ceylon pearl oyster in considerable numbers; 40 cysts have been counted in a single pearl oyster. The living worm does not induce pearl formation; this occurs only when death happens to overtake it when within certain parts of the oyster's body. As a consequence pearls are more numerous in oysters which have long been infected, where the worms are older and so more liable to die. Thus, oysters under 3½ years of age seldom produce pearls, and those but of inconsiderable size.

The parasitic worm in question has been traced by the writer from the pearl oyster to the trigger-fishes (*Balistes* spp.), which prey upon shellfish, and thence into certain large fish-eating rays, where it becomes sexually mature and produces embryos which enter the pearl oyster and begin a new cycle of life-phases. By this completion of our knowledge of the life-history of the pearl-inducing parasite it now becomes feasible to influence artificially the production of valuable pearls by the pearl oyster, whenever the oyster be cultivated in landlocked areas where infected ray fishes can be kept alive in cage enclosures.

The second or inferior class of pearls is primarily due to the formation of crystalline bodies, analogous to gall stones, within certain muscles of the oyster. These bodies become later, by causing irritation, the nuclei of pearls, coats of nacre, similar in composition to the brilliantly lustrous mother-of-pearl lining of the shell itself, being deposited concentricly around. Thus the pearl increases regularly in size. "Orient" pearls are similarly formed of successive coats, and differ solely in the character of the nucleus, *i.e.*, of the originating irritant body.

Those who desire further acquaintance with the results of the investigation above outlined will find ample details

in the Report upon the Ceylon Pearl Fishery now being published in London by the Royal Society.

Tampalakam Pearls.—A fishery for an inferior variety of small pearls was long carried on in an extensive shallow and muddy-bottomed inlet known as Tampalakam bay, a few miles to the south-east of Trincomalee, on the north-east coast. The oyster yielding these pearls is the well-known window-pane oyster (*Placuna placenta*), which has earned its name from the use to which the Chinese in some parts put its flat translucent shells. In texture and in

SHELL-HEAP OF WINDOW-PANE OYSTERS, LAKE TAMPALAKAM.

appearance the shells bear a superficial resemblance to white mica and want entirely the lustrous and dense inner coating of opaque mother-of-pearl characteristic of the true pearl oyster.

As gems, Placuna pearls have little value, wanting as they are in lustre, symmetry, and hardness. As with the chank industry, so with this, it depends for its being upon Hindu customs, such of the wealthy of India who are betel-chewers esteeming the prepared lime or "chunam," which is an essential ingredient in the mixture chewed,

much more highly if made from calcined pearls. Hence the Placuna fishery, because it furnished inferior pearls in great abundance, was so ruthlessly prosecuted during the past half-century that from an average yearly rental of £344 paid for fishery rights during the eighteen years ending 1857, and which was a small sum compared with former records, the amount dropped steadily till now the beds are non-productive. Depletion through overfishing is complete, and there is no hope for the industry without restocking from another locality. The illustration on the previous page shows a great heap of empty shells accumulated during some of the last fisheries held.

Edible Oysters.—An excellent variety of edible rock oyster is found in some quantity at Bentota, 38 miles to the south of Colombo, and also at Batticaloa, Kottiyar, and elsewhere on the east coast. Bentota sends frequent supplies to Colombo, but partly from their thin condition and small size, and from some suspicion as to the sanitary condition of their surroundings, the demand is trivial to what it might be if by the adoption of simple cultural methods a fat, well-conditioned oyster were put upon the market under an official certificate of being grown under conditions ensuring freedom from contamination. No restrictions are at present in force.

The oysters of the east coast attain a larger size. Batticaloa produces in its great land-locked backwater individuals of the size and shape of a small plate, while I have seen elongated ones from the mouth of Tampalakam bay of 10 inches in length, and others have been noted a full inch longer.

As with the majority of other edible oysters, the low salinity of backwaters and estuaries favours development. In Ceylon many square miles of such waters are available and offer splendid culture areas suitable for the raising of immense quantities of oysters if properly cultched and stocked.

Chanks (*Turbinella pyrum*).—The large and massive shells of this fine gastropod mollusc form an important article of trade in the north of the Island, being annually exported by the million to Calcutta.

Divers collect the live shells chiefly in the shallower parts of Palk Bay, which lie between Mannar on the south and Delft and Jaffna on the north. Fishing is also occasionally carried on along the north-eastern coast between Point Pedro and Mullaittivu. Many subfossil shells, esteemed much inferior in value to the live ones, are also taken

in the sand of the great embayment from Jaffna to Elephant Pass. The fishers locate their presence by means of an iron probe, which they drive time after time into the sand till at last the extremity rings sharp against a buried shell.

The large numbers sent annually to Bengal not only from Ceylon but also from Southern India are absorbed continuously to supply requirements rendered necessary by the existence of a curious funeral custom among Hindus, which compels the destruction of all personal ornaments worn by female relatives in attendance, the master of the house or the chief mourner subsequently replacing them by others. The inconvenience of destroying valuable jewellery is obvious, and so due respect to the dead is inexpensively shown by the use of rings, bracelets, and anklets sawn from chank shells. Large and perfect shells find another use, being employed, when perforated at the apex, to trumpet forth the temple's call to worship and upon all ceremonial occasions. Especially reverenced are left-handed chanks, which are rare individuals where the spiral of the shell is in reverse direction to the normal. Such shells have their value enhanced indefinitely; good examples are said to be worth now from Rs. 400 to Rs. 600; in former days such shells were assessed at their weight in gold.

Chank fishing has some importance to the local Government, both because a royalty of Rs. 2 per 1,000, equivalent to about one-twentieth the value, is collected from it and because the divers who attend whenever a pearl fishery is proclaimed are largely recruited from the ranks of the chank fishers.

In 1902 Rs. 96,416 worth of chanks were exported.

Small chank shells are in use to adorn as charms the forehead or the neck of cart bullocks.

Beche-de-mer, or **Trepang** as it is also termed commercially, is another minor fishery product collected on the northern and eastern coasts, its ultimate destination being China. The animals yielding the supply are various species of sea cucumbers (holothurians), elongated sac-shaped creatures well deserving their familiar name. Those fished are chiefly black or brown, sometimes smooth, but more often with the body studded thickly with prickle-like papillæ. Zoologically they are grouped with the star-fishes and sea-urchins, among other points agreeing with them in crawling by means of myriads of sucker feet arranged either in five equidistant bands running from head to tail, or having them massed over a special crawling surface on the under surface of the body.

The Chinese, who use them for soup-making, discriminate sharply between the different kinds. Some fetch up to £200 a ton dried, while others are not worth £40. Most of the supply is derived from Australasian waters, where "lollyfish" and "titfish" constitute important exports to China, the last-named variety being the especial privilege of the Mandarin class.

The export from Ceylon of all descriptions of bêche-de-mer amounted in value to the sum of Rs. 30,921 in 1902, a trade comparatively small but capable of considerable extension. The "fish" are collected by means of native divers and by spearing; the curing is according to approved Chinese methods.

Sponges.—The true bath sponge (*Euspongia officinalis*) occurs abundantly in certain localities around Jaffna and in Trincomalee harbour. A few men at the latter place occasionally fish small quantities and add a few rupees to their incomes by sale to the troops in garrison and to visitors, but nothing worthy of the name of an industry exists at present.

At Trincomalee the sponges are found growing profusely upon stones in shallow water in certain sheltered inlets. At low tide it is possible to wade out among them, and the writer has filled a basket with a couple of dozen nice specimens within the space of five minutes. Such a locality appears ideal ground for sponge culture, and there are many similar along the north coast.

Professor Dendy, the leading authority upon sponges, has reported favourably upon samples submitted to him, describing them as "fairly good, compact, resilient bath sponges." The establishment of a remunerative sponge fishery appears feasible, and is another of the many economic marine possibilities awaiting investigation.

Galle Marine Biological Station.—The Marine Biological Laboratory temporarily fitted up at Point-de-Galle in connection with the pearl fishing investigation is now being placed upon a permanent footing. The accommodation has been increased largely and is sufficient for the requirements of several workers.

No better site for such an institution could well be chosen within the tropics, the vicinity being rich in all that is of interest to a zoologist engaged in the study of marine fauna. In the lagoon of the fringing coral reef around the fort, corals and alcyonarians abound in myriad variety; sea urchins and star fishes of tropical types are plentiful; sluggish holothurians are everywhere, and include the giant *Synapta beselii*, which

extends its six feet of snake-like body in the shallows; the variety of marine annelids and turbellarians bewilders one; the strange *Balanoglosus* may be had by the handful; ascidians and sponges form extensive crusting growths often gaudily coloured; molluscs are there in tropical forms; while fishes, resplendent in gorgeous tints and often of grotesque form, give colour and life to the coral pools; crowds of *Amphioxus* lurk in the sands.

Richer perhaps, if that may be, than the fauna of the littoral is that of the surface waters of the bay, where the tow-net yields "plankton" of a richness that passes the imagination of a naturalist who knows but the fauna of northern seas.

By the liberality of Government accredited zoologists visiting Ceylon may have, under certain easily fulfilled conditions, permission to make use of the facilities provided by the Galle Marine Station for the furtherance of their researches.

NATIVE LIFE IN THE LOW COUNTRY.

CHAPTER VIII.

MINERAL RESOURCES.

BY

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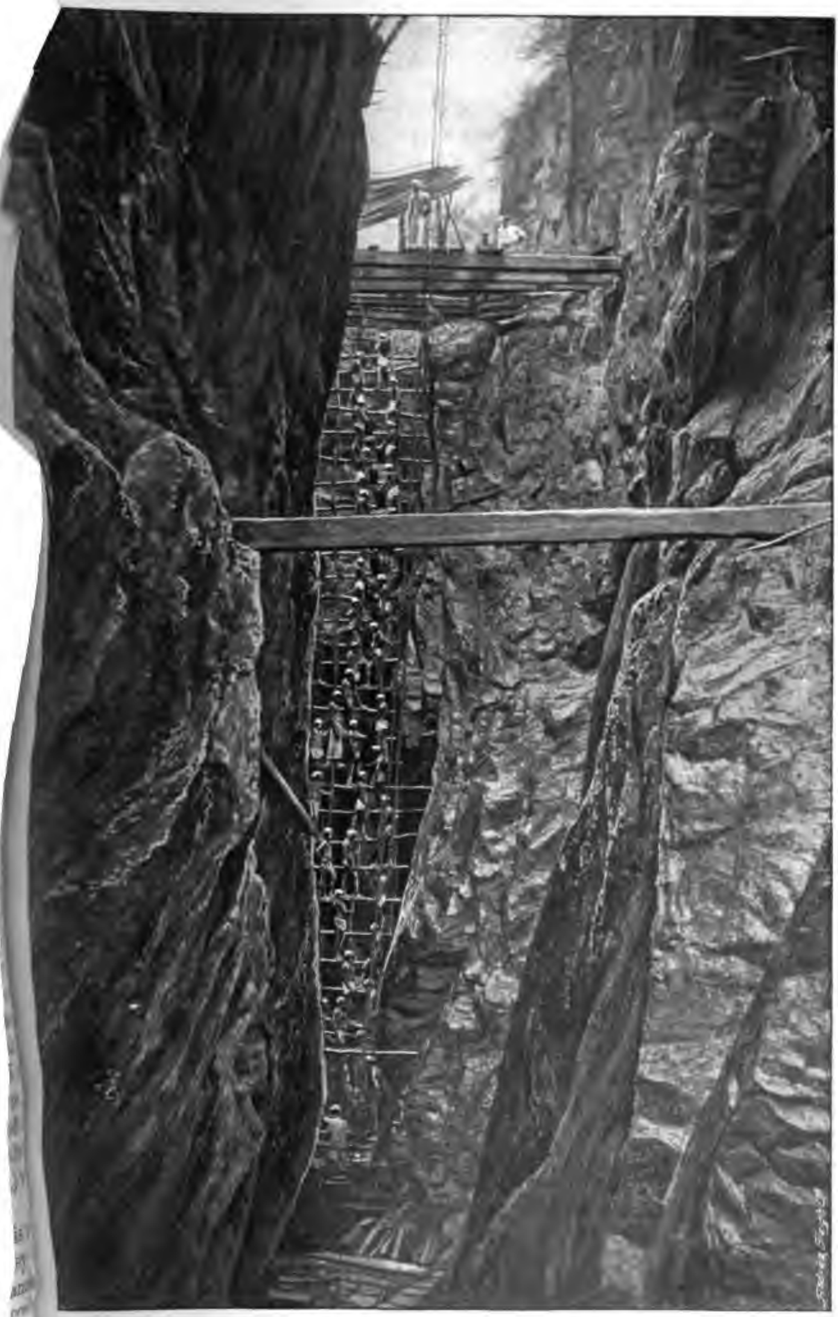
Graphite.

GRAPHITE (plumbago) is by far the most important of the minerals of Ceylon. It occurs in minute scattered crystals in some of the granulites and crystalline limestones of Ceylon; but it is only where it occurs in beds or veins crossing or running along the foliation planes of the crystalline rocks that its quantity and purity make it of commercial importance. Occurring thus, it is found in beds, veins, or nests, varying from the smallest size to a yard or more in width, and consisting of pure graphite often unmixed with other minerals. The latter however (including quartz, mica, felspar, pyronene, apatite, pyrite, &c.) are often found in association with the graphite veins.

The mode of origin of the veins of the graphite is not certainly known, though it is quite clear that they do not represent the metamorphosed remains of ancient vegetable deposits. The graphite has probably been deposited



PLUMBAGO MINE.

Photo by Skeen & Co.

from some carboniferous liquid or gas, whose introduction was posterior to the consolidation of the rocks in which it occurs. The small flakes of graphite occurring in some of the granulites and crystalline limestones seem, however, to be original.

Graphite is principally mined in the Southern, Western, Sabaragamuwa, and North-Western Provinces, at distances from the sea ranging from 5 to 50 miles, although the other Provinces are worked to a less degree.

The greater part of the graphite comes from pits or mines, the largest of which are sunk to a depth of as much as 400 or 500 feet, and in some of which steam pumps are employed to remove flood water or that arising from springs. There is usually a main shaft (see illustration opposite) with a windlass for hauling the graphite in a sort of tub, while the workmen ascend and descend by means of rough wooden ladders tied with jungle ropes, and rendered exceedingly slippery by the graphite dust and water. The graphite when brought to the surface is partially cleaned and freed from minerals or pieces of rock with which it is associated, and sent on to Colombo, where it is more carefully cleaned or "cured," and sorted into the various qualities, which are placed in casks for export.

Beside the larger mines, which are more or less constantly in work, and of which there are about twenty-five in which machinery is employed, there are innumerable small holes and shafts which have been opened by villagers and others who have discovered traces of graphite in the course of their agricultural operations. At the present time there are any number of abandoned pits of this sort; in many cases the quantity of graphite obtainable proved remunerative only while the inflated prices of a few years ago prevailed. At that time, when even a pound of graphite had a value, every small occurrence was sought out and worked. There is, however, no sign of any exhaustion of the supply of graphite which the Island can produce upon demand.

An export duty of Rs. 5 per ton is levied on all graphite shipped. From very small beginnings, less than a thousand hundredweights fifty-eight years ago, the amount exported has increased, until in 1899 it amounted to 616,385 cwt., since when, owing to the lessened demand, the amount exported has decreased to 495,508 cwt. (valued at Rs. 10,516,366) in 1902, yielding in the latter year a royalty to Government of Rs. 125,946; the amount exported has, however, increased annually since 1900.

The price of the finest graphite varies at present from Rs. 400 to Rs. 550 per ton, and of the lower qualities in the

form of chips and dust from Rs. 100 to Rs. 200 per ton. Of the exported graphite, America takes the greater part, the United Kingdom, Germany, and Belgium coming next in order.

The digging for and local trade in graphite remain chiefly in the hands of the Sinhalese ; it has, however, been mined on a number of tea estates and proved remunerative. It has been estimated that the various processes of mining, lifting, carting, sorting, packing, and shipping graphite, as well as the making of the casks in which it is exported, provide employment for about 50,000 men, women, and children.

Its uses are manifold : about one-third of the export is used in the manufacture of crucibles, one-third for stove polish ("black lead"), and the remainder for lubricating purposes, electroplating, and in the manufacture of black paint and of lead pencils.

Mica.

Mica—sometimes erroneously called talc—is found in large quantities in the central districts, where it not infrequently shows on the surface, and generally exists in the neighbourhood of the beds of crystalline limestone. Almost the only mica hitherto found in Ceylon in pieces large and clean enough to have commercial value belongs, as in Canada, to phlogopite; the greater part of the Indian mica, however, belongs to muscovite. The Ceylon mica is accordingly coloured, amber and bottle-green colours being most usual. Colourless phlogopite is also found occasionally.

Mica is not mined for in a systematic manner, but is collected by hand from pits dug where there are surface signs of a vein ; the veins are not as a rule more than one or two feet in width, and are composed of closely packed hexagonal crystals of mica of variable size, usually free from any admixture of other minerals. It is chiefly found in the Uva and Central Provinces. There is some local demand for mica in connection with the Kandyan art industries. It was largely used in the time of the Kandy kings for decorative purposes. Locally procured mica was also used in connection with the electric lighting of Kandy. The quantity exported has shown a steady decrease from an amount valued at Rs. 43,637 in 1896 to an amount valued at only Rs. 375 in 1902. There seems no reason why a more extensive trade should not be carried on.

Its splendid insulating properties, combined with its ability to withstand the highest degree of heat and to resist damp, and the fact that it is incompressible, tough, and non-

combustible, and does not absorb oil or moisture, render it extremely valuable in the manufacture of electrical machinery. It is practically the only material now used for commutator bars, for which it is eminently suitable on account of its insulating properties, great durability, and perfect cleavage, in consequence of which it can be procured of any desired thinness.

It is used frequently to separate the iron discs that go to make up the iron core of an armature; the completed core is again very generally insulated with this material to keep the armature conductors electrically separated from the iron core; in fact, mica is generally used in the manufacture of all dynamo electric machines, alternators, transformers, and electrical apparatus generally, on account of its insulating properties, combined with the other advantages mentioned above. It is also used for lamp chimneys and masks for workers in furnaces, &c., on account of its non-conducting properties for heat. There is no reason why the Ceylon trade in mica should not be more expanded in the future; the chief inconvenience in its working lies in its occurrence in small quantities in diverse localities instead of in large masses in a few places.

Iron Ores.

A considerable amount of excellent iron, as well as steel, was manufactured by the Sinhalese in past times, but the production of iron has for long almost or quite ceased. So far as is known, the amount of available iron ore is small and would not repay exploitation at the present time.

Manganese.

Ore of manganese in small quantities is widely disseminated in Ceylon.

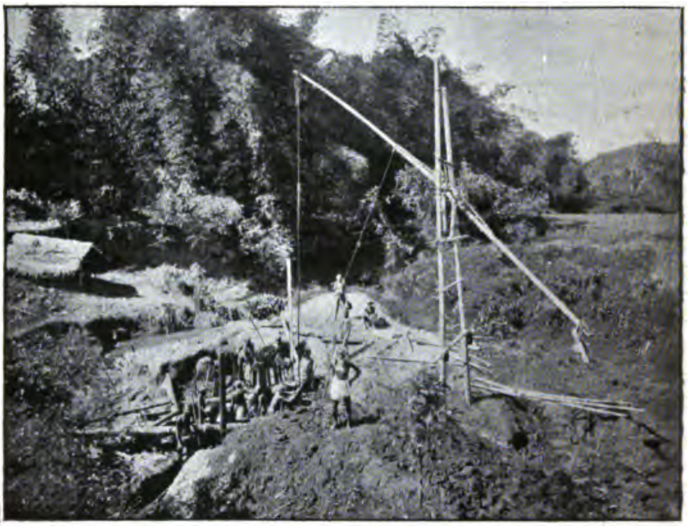
Gems.

These are for the most part obtained from the river gravels, consisting of the *débris* of the crystalline rocks. The gems occurring in Ceylon, with some of their synonyms and varieties, are as follows:—

Varieties of *corundum*, ruby, sapphire, Oriental amethyst, Oriental topaz, star stones; *topaz*, including pink and colourless varieties; *tourmaline* of various colours; *chrysoberyl*, including cat's-eye and alexandrite; *zircon* (hyacinth, jargoon, Matara diamond) of various colours; *spinel*, blue or red, including Balas ruby; *moonstone*; *garnet*, red and brownish-yellow, known as cinnamon stone; and *beryl* (aquamarine). The more definite kinds of each of these are easily recognizable, but the numerous gradations of tints make some of these stones difficult to classify, so that dealers with limited

knowledge often misapply the names. In many cases tests of hardness, specific gravity, and optical properties are necessary for an accurate determination.

Of these gems, *moonstone* is the only one almost exclusively dug from the solid rock. It is a clear variety of orthoclase felspar, and occurs in large porphyritic crystals in certain quartz-felspar rocks and pegmatites. It is especially quarried in the Dumbara district of the Central Province.



A MOONSTONE PIT.

The silvery sheen is probably due to incipient decomposition, minute flakes of kaolin being arranged in definite planes within the crystal. The best varieties are those in which the silvery sheen has a strong blue colour. The large quantity of the stone which can be obtained prevents its commanding a very high price; from Rs. 75 to Rs. 100 is the very highest price which the largest and best stones would fetch.

Garnets are likewise obtained *in situ*, though occurring also in the gravels. Garnets of small size but brilliant colour are exceedingly abundant in many of the crystalline rocks; occasionally these are large enough and good enough for use as gems, and are then usually obtained by picking out from partially decomposed portions of the rock. *Cinnamon stone*

is a variety of garnet of a strong brownish-yellow colour; it is not much valued; of ordinary garnets those are best which have a pink colour without any shade of brown. Fine fiery specimens of garnet may be worth as much as Rs. 100 or Rs. 200 or more, and cinnamon stones of a pure rich yellow colour and weighing 10 to 15 carats may fetch as much as Rs. 500 or Rs. 600; of course the stones must be of perfect colour and free from flaws to fetch these prices.

Varieties of corundum include the most important gem stones, ruby and sapphire. Of these, *rubies* are much the most valuable, it being very rarely that stones of any size without flaws are obtained. It is rarely also that the most perfect "pigeon's blood" colour is found. A ruby of about one carat and of the best colour and flawless fetches about Rs. 300 to Rs. 800; as much as Rs. 15,000 has been offered for an absolutely perfect ruby of four carats, but the price of Rs. 7,500 for a perfect six-carat stone actually sold was considered high. Rubies are thus more valuable than diamonds, as indeed they are more beautiful. Good rubies are more abundant in Burma than in Ceylon, but the best Ceylon rubies are of a purer red than Burmese rubies, being free from the suspicion of a brownish tinge which the latter possess. *Sapphires* are more abundant than rubies, and command a lower price. It is often the case that a trace of blue is seen in the red colour of a ruby; this blue tinge is sometimes removed by a process of burning. Colourless stones are known as *white sapphire;* purple ones as *Oriental amethyst;* yellow, as *Oriental topaz.* There are also *star stones*, or asteria, which when cut *en cabochon* in a particular direction exhibit a six-rayed star of light. This effect is caused by the presence of minute inclusions arranged in planes corresponding to the stages in the growth of the hexagonal crystal, producing an appearance known as "silk." In rare cases a twelve-rayed star has been observed. Many fine specimens show the star in ordinary light, but if diffused the light decreases the brilliancy of the star by reflection; the star is best seen in sunlight or artificial light. Ordinary specimens are of little value, but a fine stone commands a high price. Star stones are almost peculiar to Ceylon.

The varieties of *chrysoberyl* are very interesting. The *cat's-eye* is highly valued, and fine specimens have realized large sums, but it is affected by the caprice of fashion, not commanding a general admiration, as do the sapphire and the ruby; the result is that in some years its price is increased by a demand which in others as suddenly falls. There are inferior kinds of stones resembling cat's-eyes, such as the quartz cat's-eye and crocidolite, which is now stained to

resemble the chrysoberyl or true cat's-eye; but in no case do these compare with the real cat's-eye, which is said to be peculiar to Ceylon. Although found in several districts, the finest have been produced from the gem pits of Morawak korale.

In the same district, and it is said almost exclusively, there is found the beautiful gem called *alexandrite.* This mineral was formerly found only in the northern part of the Russian Empire, and took its name from the Imperial family. The characteristic of this gem when really fine is its rich vivid green hue by day (much darker than the emerald, and slightly bronzed), which by artificial light is completely changed to a deep red. Like the cat's-eye, this gem occasionally commands a high price in the European markets, and is sometimes sought after by Americans, and Russians who are led to suppose that the stones are of Russian origin.

The stone known as *zircon* is classified under various names, according to slight variations of colour or the imagination of the dealer who introduces it to the market. Its usual colours are various shades of brownish and yellowish red, showing in fine specimens a fiery hue which the ancients were wont to credit with supernatural powers. Many other qualities it was supposed to possess; amongst others, the power of composing the wearer to sleep and protecting him from unseen enemies. Another kind of zircon is almost colourless; it is a whitish crystal with a faint smokiness, and it is often spoken of as Matara diamond. It has of course no connection with the real diamond.

Spinels are often of a bluish colour, or red or green, usually with a touch of smokiness. The red varieties are often known as false or Balas ruby. Really good specimens of the latter variety may be very beautiful and worth as much as Rs. 100 or more, but most of the spinels obtained are very cheap.

The pale green *beryls* are found in large flawless crystals and sold under the name of *aquamarine;* it is only very occasionally that Ceylon beryls possess the true *emerald* colour.

To the mineralogist the gems are of most interest in their uncut state and in connection with their mode of occurrence in the rock. Unfortunately most of the interesting gems of Ceylon have not yet been found *in situ,* but only as more or less water-worn pebbles in the river gravels of the Balangoda, Rakwana, and Ratnapura districts. Several new minerals have been found in the heavy refuse from gem washings during the last fifteen years, and it is probable that others remain to be discovered.

GALLE FACE ESPLANADE AND COLOMBO CLUB.

CHAPTER IX.

ATTRACTIONS OFFERED BY CEYLON TO VISITORS.

BY

The Hon. Mr. J. FERGUSON, C.M.G., F.R.C.I., Editor of the "Ceylon Observer" and Official Visitor to the Ceylon Court.

IN speaking of *attractions* it is well to begin with the opening sentence in Sir Emerson Tennent's monumental work on the Island: "Ceylon, from whatever direction it be approached, unfolds a scene of loveliness and grandeur unsurpassed, if it be rivalled, by any land in the universe." The visitor is "entranced by the vision of beauty which expands before him as the Island rises from the sea, its lofty mountains covered by luxuriant forests, and its shores, till they meet the ripple of the waves, bright with the foliage of perpetual spring." Sir Charles Dilke—who, as a young man, went round the world and wrote "Greater Britain"—confessed that only in the mountains of New Zealand had he seen scenery to approach that of the hill-country of Ceylon. Haeckel, the German philosopher, during a stay of some months, expressed himself in rapturous terms about the low-country and the sea coast; and the present Lieutenant-Governor of the Colony, with prolonged experience of the West Indies and South America, confesses he has seen nothing to approach the outlook from the railway incline between Colombo and Kandy.

As to *Climate*, Ceylon embraces a great variety between Colombo on the sea level and Nuwara Eliya, the sanitarium, at 6,200 feet altitude. Here is a little table indicative of the principal stations all along or near the main railway line:—

Name, and Altitude above Sea Level.	Average Shade Temperature. °	Average Annual Rainfall. In.	No. of Days with Rain per Annum.
Colombo, sea level ...	81 ...	88 ...	174
Kandy, 1,650 feet ...	75 ...	82 ...	192
Hatton, 4,150 feet ...	63 ...	149 ...	255
Nuwara Eliya, 6,200 feet	58 ...	94 ...	204
Bandarawela, 4,000 feet	66 ...	67 ...	127

In addition it may be mentioned that Point-de-Galle, also reached by railway, has much the same climate as Colombo; that Jaffna in the north, Trincomalee in the north-east, and Batticaloa in the east are hottest, and comparatively dry; and that Anuradhapura, the famous "buried city," is also dry and usually hot. The months to be avoided by visitors to Ceylon are June and July and October and November, though seasons often vary. To be sure of fine weather in Colombo, as well as for travelling in the interior, February to May inclusive can safely be recommended to the visitor; and Nuwara Eliya, especially, is climatically quite delightful during what is "the season" for the sanitarium in these four months, while often enjoyable in August, September, December, and January.

As regards the *accessibility* of Ceylon to visitors, we need only mention that half-a-dozen first class lines of ocean-going steamers compete in the carrying of passengers from London, Marseilles, Genoa, Naples, Brindisi, or Trieste to Colombo, the duration of passage being from twenty-five to fourteen days, the cost for each passage ranging from £40 to £65; while return tickets can be got at proportionately lower rates. Landed in Colombo, the visitor will find a choice of first class hotels with moderate charges.

The chief attractions in the commercial and political metropolis of the Island are found in the delightful drives over some of the smoothest and best roads in the world and in the most varied tropical vegetation, and in observing the great number of different races among the population and watching the people in their every-day life. This is best done by a carriage drive to and from Mount Lavinia and by a trip on the tram cars through the most crowded parts of the city.

Among excursions of interest to visitors we may mention the coach or steamer trip to Negombo, the district *par excellence* for the finest cinnamon in the world; the railway

drive to Point-de-Galle and Matara of 91 miles along the sea coast; and the railway drive to the Kelani Valley tea, rubber, and cocoanut district; with a coach journey to Ratnapura, "the city of gems," which has gem-digging pits in the neighbourhood. Proceeding up-country, the visitor is carried by a first class railway to the famous Peradeniya Botanical Gardens and to Kandy—both uniquely beautiful, and the latter historically and religiously full of interest. (We do not enter into details, because local guide books are freely available.) Thence the far-famed "Buried Cities of Ceylon" can be visited by coach, although Anuradhapura will be easier reached by railway from Colombo before June, 1904.

MOUNT LAVINIA HOTEL AND BEACH.

It may be said that the Kandyan country is as celebrated for legendary and historical story as are the lowlands of Scotland; while only in Egypt are the ancient monuments of Anuradhapura and Polonnaruwa excelled. South-eastwards, the railway from Kandy carries the visitor through a succession of planting districts and little towns to Nuwara Eliya, or on to the highlands of Uva with surpassingly beautiful scenery and fine climate. For the visitor who wishes to see Jaffna, Trincomalee, and Batticaloa comfortable steamers running round the Island are available.

As regards *Sport*, the attraction of Ceylon to visitors consists in the opportunity presented for elephant shooting, after procuring a license, in the Hambantota District, or in the eastern or north-central portions of the Island. Anuradhapura and Trincomalee are good centres, where also wild buffalo, bear, boar or wild hog, and cheetah hunting afford good sport. The hunting of elk or sambur with dogs and knife is a favourite pursuit around Nuwara Eliya and in several of the planting districts, while fair trout and carp fishing can also be enjoyed on payment of a license at and near to Nuwara Eliya. In March, April, or generally early May, there may be an opportunity off the north-west coast for witnessing a pearl-oyster fishery with the operations of the native divers on the banks and of the selling and clearing of the oysters ashore, making a unique experience to the visitor. Steamers run during the fishery between Colombo and the scene of operations.

Shooting Trips in Ceylon: Good Centres for Sport, and how to reach them from Colombo.

The best available book on sport is still Sir Samuel Baker's "Rifle and Hound in Ceylon," though published nearly forty years ago. A new edition was published a few years ago. The following itineraries, necessarily brought up to date owing to additional railway facilities, are taken from this book:—

"*No. 1, The Park Country and Batticaloa Tanks.*—Game: elephants, deer, cheetahs, bears, pigs, teal, snipe, peafowl, &c., &c. To Bandarawela by rail to Badulla, hired carriage, 18 miles; to Bibile, hired carriage, 37 miles; to Nilgala, good bridle road, 15 miles. This is a good centre for the Park Country. To Ambari tank, 31 miles.

[Excellent country for all the above game: Erikamam, Devilane, and other large tanks in the vicinity.]

"*No. 2, The Horton Plains.*—Game: elk, deer, elephants, spurfowl, &c., &c. (now fishing also). To Pattipola by rail; to the Horton Plains, 6 miles, by good bridle road.

"*No. 3, Trincomalee District.*—Game: elephants, bears, cheetahs, deer, teal, snipe, &c., &c. To Trincomalee, by steamer, or by road from Matale; from Trincomalee to Kottiyar by boat; Kottiyar to Toppur (Allai tank), 7 miles, good centre for sport of all sorts. Kanthalai tank, 24 miles from Trincomalee on Matale-Kandy road, good centre for sport.

"*No. 4, Puttalam District.*—Game: elephants, cheetahs, deer, partridge, &c., &c. From Colombo to Puttalam by

SHADOW OF ADAM'S PEAK.

Photo by H. W. Cave.

canal and road, 84 miles. Puttalam to Pomparippu by lake or road, 25 miles, good centre for sport. Pomparippu to Marichikaddi, 18 miles, bridle road, excellent country for game of all sorts.

"*No. 5, Hambantota District.*—To Matara by rail; coach or hired traps to Hambantota. By steamer to Galle and Hambantota, and thence cart to Yale.

"*No. 6, Minneri and Polonnaruwa.*—To Matale by rail, Matale to Habarana by road, 44 miles, good carriage road; Habarana to Minneri, bridle road, 15 miles; Minneri to Topari (Polonnaruwa), 12 miles."

PADDA BOATS ON KELANI RIVER.

CHAPTER X.

THE CEYLON EXHIBIT AT THE WORLD'S FAIR.

BY

PAUL PIERIS, M.A., Ceylon Civil Service, Barrister-at-Law.

A TWO-STORIED rectangular building, 120 feet long and 60 feet wide, with broad verandahs running round each floor, the whole designed after the Sinhalese fashion, forms the Ceylon Court at the World's Fair. From the centre springs an octagon, 75 feet high, copied from the building where the Sinhalese king used to show himself to his subjects at Kandy.

Smaller octagons rise from the four corners. The door-steps reproduce the moonstone, so characteristic an ornament of ancient Sinhalese architecture, and the janitors, so vigorous and so grotesque, seen at many a ruined temple. The doorways, with their handsome brass knockers, and the curious capitals of the verandah posts, should be noticed. On the ground floor is the Tea Room, where Sinhalese waiters, with long hair and tortoise-shell combs, serve this delightful beverage in cups adorned with the Ceylon device of the elephant and dagoba. On the same floor is a Commercial Room, where an experienced Commercial Agent

despatched by the Government of Ceylon is prepared to supply all information bearing on trade, and to book orders to be executed in Ceylon. Adjoining are the clerks' offices and the rooms of the two Assistant Commissioners for Ceylon: Mr. R. Huyshe Eliot, ex-Chairman of the District Planters' Association, Dikoya, and Mr. P. E. Pieris, a Sinhalese and a member of the Civil Service of Ceylon. All information regarding the various articles shown will be gladly supplied here.

Upstairs are the rooms of the Commissioner-General, Mr. Stanley Bois, an ex-Member of the Legislative Council of Ceylon, and ex-Chairman of the Ceylon Chamber of Commerce.

The door panels of red and yellow and black represent Sinhalese painting untouched by the Western influences which show themselves in the friezes depicting various birth stories of the Buddha, all the work of Sinhalese artists. Their carving as found in the Ceylon temples is also shown in the images of Buddha in the three attitudes of admonition, meditation, and repose, and in the images of female deities exhibited by Mr. W. Chapman Dias.

The **various races of Ceylon** are represented by life-sized models in clay, the property of the Government of Ceylon. They include a Buddhist priest with shaven head and yellow robes, carrying his alms bowl in his hand; Sinhalese chiefs of the hill- and low-country; a Vedda, an aborigine of Ceylon, and a Veddee, his wife; a Sinhalese bride of the seventeenth century; a Chetty, one of a small but high caste from India—whose gorgeous gold-worked costume is exhibited separately—all the work of a local artist, Mr. R. G. Andriesz, who also exhibits the model of a "basket woman" or itinerant vendor of vegetables. Several small models furnished by the Colombo Museum and the Government Agent of Jaffna will be found of interest.

Charts will be found on the walls, graphically illustrating the fluctuations in and expansion of the trade of the Island. The handsome model of the Colombo Harbour (see Chapter I., "Ceylon and its Administration"), made to scale by Mr. Steyn under the supervision of the Resident Engineer of the Harbour Works, is shown by the Ceylon Government.

Ceylon scenery and life are amply illustrated by the magnificent series of photographs supplied by Messrs. Skeen & Co., Plâté & Co., the Colombo Apothecaries' Co., Ltd., and Mr. A. W. Andrée, the chief professional photographers in Ceylon. Mr. H. C. P. Bell, C.C.S., Mr. F. W. Bois, Mr. H. W. Cave, and Mr. W. D. Bosanquet also show views of great archæological and general interest.

The **Musical instruments** in use among the natives of this day are few in number and of no melody; they consist of a variety of drums—64 of which are known—and a few wind instruments, including the raucous chanks, so essential to the service of a Hindu temple. A fairly representative collection of these is shown by the Ceylon Government. Akin to them are the **Masks**, several hundreds of which are available for sale; these are chiefly employed in the "dances" that are performed, with long incantations, over persons afflicted with the various diseases ascribed to various "devils." They are chiefly manufactured in the south of Ceylon. The list of **Medicinal plants and drugs** known to the native doctor is infinite, and several of them have been already transferred to the Western Pharmacopœia. The science is chiefly empirical, but the experience of 25 centuries has laid bare knowledge of much value, and the skill of the Vedarala in purely tropical diseases like dysentery is unquestioned. The jealousy with which special knowledge is concealed by its possessor has unfortunately greatly hampered the progress of the science. A collection of the chief medicinal plants is shown by Mr. C. Drieberg, Superintendent of School Gardens. Medicinal oils, some of them of undoubted efficacy, play an important part in the treatment. They are exhibited by Mr. M. C. Fernando and Mr. P. Perera Gunasekera, as well as by the Ceylon Government.

The chief economic products of the Island are discussed at length in Chapter V., "Agriculture." The **Cocoanut**, which covers the largest acreage of cultivated land, is particularly well represented in all its branches: oil, copra, poonac, desiccated cocoanut, arrack, &c. The uses of the tree are infinite, and it yields six crops in the year. The exhibits of Messrs. Leechman & Co. and Messrs. Freudenberg & Co. of Colombo are comprehensive, and the desiccated cocoanut shown, among numerous others, by Messrs. J. C. de Silva & Co., should be noted. Mr. C. E. A. Dias of Panadure has a good exhibit of cocoanut vinegar and arrack, as well as a model of the still used in distilling the latter. Old arrack is much prized as a liqueur. Mr. C. Stouter exhibits some cocoanut oil sixty-eight years old, which is greatly in demand among native medical practitioners for its curative properties. Messrs. J. W. Chas. de Soysa, T. G. Harrison, and C. P. Hayley have a good display of cocoanut fibre. The samples of pure hair oils from the king cocoanut exhibited by Mr. J. P. Obeyesekere should be noted; the luxuriant and glossy hair of the natives is ascribed to the frequent use of this oil.

Rice, which ranks next in point of acreage, is the universal food of the Island, and about 350 varieties of it are recognized. The grain does not lend itself to exhibition, but samples are shown by Mr. A. P. Goonetilleke, who also exhibits fine grains, consisting chiefly of millets and pulses. A curious tray made of grains of rice in the husk (paddy) is shown by Mr. H. T. S. Ward, Director of Irrigation.

There are over a hundred exhibitors of **Tea**, the most important product of Ceylon from a commercial point of view. All qualities and grades of black and green may be seen, though perhaps it will be found in its most agreeable shape in the freshly poured article sold in the cup in the Ceylon Court. Trade information about this and other commercial products will be found in Chapter IV.

The **Kitul palm** (*Caryota urens*), which thrives best in the damp mountainous zone, is represented by its valuable black fibre, and the "jaggery" or coarse sugar made from the sweet "toddy" drawn from its "flower" by a special caste, with whom this sugar is an important article of diet.

Arecanuts (*Areca catechu*), also called betel-nut, the fruit of the most graceful of the Ceylon palms, flourish everywhere. All that can be spared from local consumption is exported to India. It is the essential concomitant of the "betel" leaf (*Piper betle*) chewed universally by the natives, and was one of the chief sources of revenue of the Sinhalese kings. The nut is a valuable tanning agent, and when roasted and powdered is an excellent dentifrice; it is exhibited by Mr. J. P. Obeyesekere, Dr. W. H. de Silva, and Mr. A. P. Goonetilleke.

Mr. A. E. Rajapakse has sent in a comprehensive exhibit of **Cinnamon** and the implements used in its preparation; also photographs illustrating the manufacture of the product. The oil is shown by Mr. H. L. de Mel and others.

Citronella oil (*Andropogon nardus*), so much in demand among perfumers, is manufactured exclusively in the south of Ceylon, from where are sent Mr. B. Samaraweera's exhibit and numerous others. Besides the exhibits of **Cacao** in the bean, Messrs. C. C. Barber & Co. show prepared **Cocoa** and **Chocolate** and **Cocoa butter** (locally manufactured in the only Cocoa factory in the East); Mr. M. B. Swampillai, **Tobacco**; Mr. H. V. Bagot of Kalutara, the **Para rubber** which secures so high a price in the London market; and the **Cardamom Committee** the dainty seed which they are exploiting in the chief countries of the world.

The production of West Indian **Arrowroot** is small and insufficient for the local demand. **Manioc** (*Manihot utilissima*), from which cassava is made, is an imported product

chiefly cultivated in newly cleared lands; it is largely used as a food product by the natives. **Flour** is also obtained from the pith of the Kitul palm (*Caryota urens*), the fruit of the banana, and various cereals and tubers. There are good exhibits of these products by Mrs. Arnold Dias, Mr. W. Don Carolis, and Mr. Chas. Stouter.

The **Spices** of secondary importance, though common in the country, are not much cultivated. The Ceylon Government has an exhibit of nutmegs and mace, Mr. H. V. Bagot of cloves, Mr. J. P. Obeyesekere and Messrs. C. C. Barber & Co. of pepper, which is found growing in a semi-wild state in most villages, and Dr. Valentine Duke of nutmegs and cloves.

Chaya root (*Oldenlandia umbellata*), a wild product, is largely employed in the Northern and Eastern Provinces in dyeing the cloths, several of which are on show, worn by natives; the supply is barely sufficient for the local demand. There is a small export of the **Orchella weed** (*Rocella Montagnei*), a lichen found growing on the stems of cocoanut trees. **Sapanwood** (*Cæsalpinia Sapan*), the root and stem of which are chiefly used for dyeing, is largely exported; the tree is common in village hedges, and when covered with its flowers resembles the laburnum. The model of the Buddhist priest is draped in robes dyed yellow with the root of the **Jak** (*Artocarpus integrifolia*). The fruit of this tree, perhaps the largest fruit on earth, is largely used as an article of food by the natives, the seed closely resembling the chestnut in taste. The various **Dye stuffs** are exhibited by the Ceylon Government.

Myrobalans, the fruit of the *Terminalia belerica* and *T. Chebula*, are also largely employed both in medicine and as tanning agents. The firm of W. Don Carolis have the chief tanning establishment in the Island; they exhibit the **Tanning barks** employed by them, viz.: Ranawara (*Cassia auriculata*), Kadol (*Rhizophora Mucronata*), Timbiri (*Diospyros Embryopteris*), &c. Their collection of **Leathers** will repay inspection.

Mr. C. Drieberg, Superintendent of School Gardens, and Secretary to the local World's Fair Committee, furnishes the following notes on **Oils, Fibres, Gums,** and **Resins** :—

"Besides the cocoanut palm, which is *par excellence* the cultivated oil-producing tree of Ceylon, there are also cultivated—but to a small extent only—Mustard (*Brassica Juncea*), the oil from which is employed medicinally and for culinary purposes; Gingelly (*Sesamum indicum*), which yields the oil used for cooking as well as in medicine, both as a laxative and as an emollient; and Croton (*Croton*

Tiglium), which furnishes a powerful purgative oil. Of wild or uncultivated oils, the most commonly used are Kekuna (*Aleurites Triloba*) and Domba (*Calophyllum inophyllum*), chiefly as illuminants, but also valued medicinally. Mi oil (*Bassia longifolia*) is of a heavy consistency inclining to solidity and used for burning. Samples of Kekuna and Mi sent to England have been well thought of for soap-making and other purposes. Kohomba or margosa (*Azadirachta indica*) is the name of a disagreeably smelling heavy oil, which, however, possesses most valuable antiseptic properties. Cashew or caju oil (*Anacardium occidentale*) is of two kinds : the one from the kernel is sweet and bland, that got from the shell is acrid and acts as a powerful vesicant. The wood oil obtained from the Dorana tree (*Dipterocarpus glandulosus*) is resinous and useful for making varnishes. The Kina (*Calophyllum tomentosum*) and Mihiriya (*Palaquium petiolare*) yield oils of minor importance: the former is used for burning and also medicinally; the latter, which is of a semi-solid consistency, for medicine and food. Still another oil used, but only to a small extent, for burning is that obtained from Kon (*Schleichera trijuga*), also known as the Ceylon oak. The grass yielding lemon grass oil, got from *Andropogon Cittratus*, is cultivated to a limited extent. It belongs to the class of essential oils. A sample is shown by Messrs. Winter & Sons.

"Besides the commercial fibres obtained from the cocoanut, kitul, and palmyra palms, the Island is particularly rich in fibres yielded by uncultivated plants. These are of the greatest use to the villager in his every-day life, though not produced in sufficient quantity for export. The more important wild fibres are Niyanda (*Sanseviera zeylanica*), used in the manufacture of Kandyan mats, whips, &c., and Hana (*Crotalaria juncea*), for fishing nets; but the following list includes the names of many that serve the people well and are worth looking into :—Kala (*Derris scandens*), Gas-netul (*Ficus gibbosa*), Ma-usa (*Laportea crenulata*), Kalaha (*Ficus infectoria*), Telaboo (*Sterculia fœtida*), Piti (*Antiaris innoxia*), Kiriwala (*Holarrhena mitis*), Rankiriya (*Alpinia nutans*), Dul (*Anodendron paniculatum*), Beli (*Ægle Marmelos*), Gona (*Diospyros insignis*), Nuga (*Ficus altissima*), Ma-erammiya (*Zizyphus Ænoplia*), Belipatta (*Hibiscus tiliaceus*), Nava (*Sterculia Balanghas*), Liniya (*Helicteres Isora*), Daminiya (*Grewia tiliæfolia*), Suriya (*Thespesia populnea*), Pus (*Entada scandens*), Bevilla (*Sida aculeata*), Kapukinissa (*Hibiscus angulosus*), Wal-anoda (*Abutilon asiaticum*), Ehetu (*Ficus Tsiela*), Hinguru (*Acacia concinna*), Wala (*Gyrinops wala*), Gedumba (*Nema occidentalis*),

Bo (*Ficus religiosa*), Halmilla (*Berrya Ammonilla*), Tala (*Corypha umbraculifera*), Kahata (*Careya arborea*), Epala (*Tiumfetta rhomboidea*), Napiritta (*Hibiscus furcatus*), Hik (*Odina Woodier*), Kita-dimbula (*Ficus hispida*), Geradi-dul (*Boehmeria malabarica*), Ratasapu (*Michelia Champaca*).

"The resins exhibited are Hal (*Vateria acuminata*), perhaps the best of our resins, and exported to some extent, Dun (*Doona zeylanica*), Yakahalu (*Doona Trapezifolia*), and a ground resin or 'bin-dumala.' Gamboge from *Garcinia morella* is also shown.

"An excellent specimen of Caju gum (*Anacardium occidentale*), the best of Ceylon gums, is on exhibition.

"The exhibits of oils, fibres, and resins are nearly all shown by the Ceylon Government and Mr. S. D. Mahawalatenna, a Kandyan Chief of enlightenment and enterprise. A specially fine collection of fibres, both indigenous and introduced, is sent by Messrs. William Bros., seedsmen, of Henaratgoda, a native firm that has done much in the way of exchange of seeds and introduction of new products."

Though the **Sugar cane** is grown in every village, the attempt to manufacture sugar for commercial purposes has not proved a success, and the only makers at present are Messrs. Winter & Sons, mentioned above, whose sugar and rum are on exhibition.

The delicious **Caju nut** is exhibited by Mr. P. E. Pieris; the tree is found in every village and has two crops in the year. Confectioners in search of novelties may well pay attention to it.

The **Forestry Exhibit** (see Chapter VI., "Forestry") furnished by the Government of Ceylon contains specimens of the more useful timbers of the country, ingeniously displayed in a handsome setting. Among the cabinet woods the **Calamander** (*Diospyros quæsita*) is easily the first; to the Sinhalese this exquisite wood with its rich colouring—the colour of honey, say they—and beautiful veining, its silkiness and natural lustre, is as precious as was the Citrus to the Roman. Found in the densest and most desolate forests in a steep corner of the Wet Zone, the tree is confined to Ceylon, and here too the greed of man has almost led to its total extinction: the timber is no longer an article of commerce. An elaborate cabinet made from this wood by native carpenters, which is available for sale, should be noted; as a specimen of carving it ranks among the best productions of recent times. Clusters of Ceylon fruit in their natural size depend from the niches in the corners; palms within borders of ornamental creepers fill the eight panels, which are finished off with

A KANDYAN CHIEF: Photo by A. W. Andree.

THE HON. S. N. W. HULUGALA, MEMBER OF THE LEGISLATIVE COUNCIL OF CEYLON.

heads of animals. A villager on his way from the field, his wife carrying a sheaf of the "paddy" plant and leading her naked child, a Mudaliyar and a Ratemahatmaya and their wives, are figured with remarkable skill. Crowning all is a graceful dagoba, with two devotees prone on either side, and two eagles gazing on it from afar.

There are also several small boxes and other articles on exhibition. The trade calamander of to-day is well represented by the carved settee and pair of chairs shown by Messrs. H. Don Carolis & Son, the leading furniture dealers in Colombo.

Ebony (*Disopyros Ebenum*) is sister to calamander; a massive semi-circular table of this elegant and valuable cabinet wood, designed after an ancient moonstone, is exhibited by the Anglo-Oriental Furnishing Co. of Colombo, and a handsome table of inlaid Ceylon woods with an ebony pedestal by Mrs. W. L. H. Skeen.

There are also several beautiful tables of various Ceylon woods inlaid with ivory available for sale, as well as a miscellaneous selection of carved ebony boxes, writing cases, jewel boxes, photograph stands, elephants, walking sticks, &c.

Some of the prettiest exhibits are inlaid with **porcupine quills**, the work of the Galle artisans, famous throughout Ceylon for their skill in carving, and they include another settee and pair of chairs, also exhibited by Messrs. H. Don Carolis & Son. Curious **walking sticks** made of arecanut (*Areca catechu*) and **fans** made of the compressed leaves of the palmyra (*Borassus flabelliformis*) by the patient Tamil workmen of the north, **State umbrellas** made of the fronds of the talipot (*Corypha umbraculifera*), **crabs** carved out of the wood of the calamander and suriya (*Thespesia populnea*), and **cocoanut shells** delicately and curiously carved into all manner of articles, will also attract attention. The red **halmilla** (*Berrya Ammonila*), with its tough and elastic wood, is much in demand among carriage builders, and is largely exported to India. A massive column of this wood, carved in imitation of a stone column from a sixteenth century temple, should be noticed.

The **Tamarind** (*Tamarindus indica*), one of the heaviest of Ceylon woods, is nowhere found in a wild state; its rare and richly variegated heart-wood, closely resembling calamander, is well illustrated by the handsome cabinet, copied from an ancient Dutch article, exhibited by Mr. P. E. Pieris, C.C.S. The fruit of the tamarind is largely used in native cookery and its leaf in medicine.

Rushes of various kinds abound, the mats made of them being the beds in use in the large majority of native

households. A large number of these, some of strikingly handsome design, are exhibited by the Ceylon Government, as are also the baskets, &c., for which the towns of Kalutara and Galle are famous. The last are made of the prepared leaf of the wild date palm (*Phœnix zeylanica*). The mats shown from Dumbara are of the Niyanda fibre (*Sanseviera zeylanica*).

Rattan of various kinds (species of Calamus) is found in great abundance in the forests of Ceylon, but it is considered inferior to the article imported from the Malay Peninsula. It is put to a variety of uses, from the supports of the heavy cart tents to the expensive matting, costing 30 rupee-cents per square foot, the coolest and cleanest carpet in a tropical climate. The trade is chiefly in the hands of the local Malays, and some good samples are shown by one of them, Mr. A. C. Sumps of Colombo. The jinricksha, a vehicle of Japanese origin, and a cane settee should not be overlooked.

Plumbago, which is exported so largely to the United States, is fully discussed in Chapter VIII., "Mineral Resources." The article is exhibited by the chief mine owners and the merchants who deal in it, and blocks shown by Mr. H. Bastian Fernando and Mr. James Fernando are of special interest for their unusual size. There are also figures of animals, &c., carved from the mineral.

The **Steel** used in the ancient arms on exhibit is of local manufacture, now almost extinct in view of the cheapness of the imported metal.

Mica from Badulla is on show, and several of the Sinhalese palm leaf umbrellas, &c., are ornamented with this article.

The **Gems** of Ceylon are world-renowned. From Ratnapura, the City of Gems, comes the rude appliances used in the shallow pits where the beautiful rubies and sapphires are found—the iron rod for locating the gem-bearing gravel, the "mamoty" used in raising the gravel to the surface, and the cane basket in which the gravel is washed—as well as those employed by the lapidary in cutting and polishing the stones—the stone disc fixed vertically, on which the "corundum" dust is spread, the short stick to which the gem is attached, and the horizontal copper wheel on which it is finally polished. A "pigeon's blood" ruby set in a ring is exhibited by Mr. D. J. Jayatilleke, J.P., who owns a famous pit at Ratnapura; a magnificent sapphire and large cat's-eye by Mr. Magdon Ismail, J.P., a leading gem merchant; and the lapidary's corundum by Mr. P. E. Pieris, C.C.S. The Government has also on view a collection of Mineralogical specimens prepared by Mr. A. K. Coomaraswamy, B.Sc., writer of the article on "Mineral Resources."

The caste of **Smiths** have long been famous for their artistic skill and had always been favoured by the Sinhalese kings; important settlements of them are found near the towns of Colombo, Kandy, Galle, Ratnapura, and Kegalla, and numerous specimens of their various productions, including trays, boxes, heppuwas, betel-boxes, and ornaments of all kinds are on view. A handsome silver tray from Kalutara and an octangular box of Ratnapura workmanship exhibited by Mr. P. E. Pieris, C.C.S., should be noted. There is also a large collection of the jewellery worn by the middle classes, which has been much influenced by Western models. Don Adrian Wijeynarayane has for sale some modern jewellery at moderate prices. Mr. O. L. M. Macan Marikar shows a gorgeous triple set of bracelets, encrusted with diamonds, emeralds, and sapphires, such as are worn by Moorish ladies; and Don Theodoris & Co. a handsome gold cigarette case and a large ebony elephant with heavy silver caparisoning. An enterprising "Moor" tradesman has opened a booth in connection with the Ceylon Court.

The smiths of Galle are among the chief ivory carvers in Ceylon, and their work is well illustrated by the caskets exhibited by Messrs. D. F. de Silva & Co. and Don Theodoris & Co. Their wealth of detail and perfection of finish, whether in the imitation of an ancient design from Anuradhapura or in depicting some village scene of temple and palm trees, the depth and minuteness of the work, their rich mounting of solid gold and varied gems, entitle them to be ranked among the most perfect specimens of Sinhalese art. The gem-encrusted ivory elephants exhibited by Messrs. D. F. de Silva & Co. and Mr. Abdul Caffoor are worthy of a place in the collection of any millionaire. The large ivory fan handles used by the Buddhist priests should not be overlooked. The **brass** trays, vases, and lamps are the production of Kandy and Negombo. The beautiful **tortoise-shell work**, some of it of remarkable merit, which is exhibited by D. B. David Hami, comes from Galle; the shell that is used is chiefly imported from the Straits. The main stages in the manufacture of a comb, and the tools employed, are also exhibited.

Ceylon **Lacquer**, the work in which is confined to a few villages, is represented by the large collection of toys, tea tables, children's chairs, &c., procured from Hambantota, and the spear handles and plaques from Matale.

The painted **Kandyan pottery**, with its bold designs in yellow and black and red, the common village pottery made by a special caste and used in every household in Ceylon, and the various clays employed in its manufacture, are all shown by the Ceylon Government.

The **Lace industry** was probably introduced into Ceylon by the Portuguese, and it is chiefly carried on at present by women in the neighbourhood of Galle and Colombo. There is a representative exhibit, including the pillow and bobbins employed, shown by the Ceylon Government, while the Galle Convent, which is doing such excellent work among the Sinhalese, shows trade samples of the lace made by the girls taught there. A remarkable piece of cotton lace, 30 in. wide, is exhibited by Jayatilleke Hamine of Matara.

The specimens of **Arms** shown are characterized more by their beauty than their destructive capacity. The weapons carried by the foot soldier when the Portuguese brought their gunpowder into the country at the beginning of the sixteenth century are well illustrated by the handsome spears with lacquered handles exhibited by the Ceylon Government, and by the bows and arrows carried by the clay figure of the Vedda. Shields are no longer found in the country, save the ceremonial ones in use at temples. The elaborate military system of the Sinhalese was carefully continued by the Dutch, and all who held land on military tenure were enrolled in companies or ranchus of twenty-four soldiers under the command of an Arachchi, six to twelve ranchus being allotted to each Mudaliyar or District Chief. Though guns and small cannon of excellent local make were largely used by the Sinhalese in their wars with Europeans, a hundred years of peace and cheap imported guns have practically killed the manufacture. A cannon presented by a Sinhalese nobleman to the Dutch Company in 1745 may now be seen at the Museum at Amsterdam.

The **sword** and the **dagger** mark the grade of the wearer, though the distinctions which marked inferiority of caste are no longer adhered to. The Maha or Chief Mudaliyar is alone entitled to wear a sword in a gold scabbard. Mr. E. R. Jayatilleke Gooneratne, Mudaliyar, exhibits a specimen of the sword usually worn, as well as a mourning sword of tortoise-shell. The Chiefs of the Kandyan Provinces usually wear daggers, though several of their swords are also on view. Special attention is invited to the exquisite design and finish of the silver-mounted daggers exhibited by Mr. P. E. Pieris, C.C.S., and the silver styli for writing on palm leaves which accompany them. The handles are usually of ivory and rhinoceros or buffalo horn, though jade and crystal are sometimes used. There is also a small exhibit of the modern village dagger, which is chiefly used by criminals, as well as of a gun made by a village blacksmith.

Ceylon is famous as a field for the sportsman, and the Government is exhibiting a representative collection of

Sporting Trophies, including elephants, leopards, boars, buffaloes, sambur, snakes, and birds of exquisite plumage. A curious black leopard skin is shown by Maduanwala Ratemahatmaya, a prominent Sinhalese Chief, and another collection has been sent in by Mr. Lazarus, a local taxidermist. The swallow which makes the edible nest (*Collocalia francica*) is well known in Ceylon, whence there is a small export of the nests to China; the bird and its nest may be seen prettily mounted.

The **Fishing industry** is fully discussed in Chapter VII. by Mr. Hornell, the Government Marine Biologist, under whose superintendence the exhibit has been prepared, and who has also furnished photographs. The various kinds of boats and nets in use are illustrated by models, while a full-sized outrigger canoe may be seen plying in the water by the side of the Court in the charge of a Sinhalese fisherman. The exhibit of the fascinating **Pearl Fishery** should attract attention: the precious oyster is shown in all stages of its growth, with dissections showing the pearls *in situ*. Here may be seen the Trigger fish (*Balistes* spp.), which preys on the oyster and also harbours the pearl-inducing parasite, an excellent model of a pearl-fishing boat, the diver's stone, basket, and nose clip, the brass sieves used in sizing the pearls, the crude drill with which the pearl is so exquisitely bored, &c. A series of photographs illustrates the whole history of a fishery.

The ugly **Beche-de-mer** (*Holothuridæ*) beloved of the Chinese, with the various spearlike implements used in its fishing, native-cured **Sponges** from Trincomalee, the translucent shell of the "window pane" oyster, the ingenious fish traps of the Sinhalese and Tamil villagers—unchanged in design and make for centuries—will all be received with interest, especially so the two abnormal silver-mounted **Chanks**—left-handed says the Scientist, right-handed says the Oriental—so sacred to the Hindu.

Coins have been struck in Ceylon by the Sinhalese, Portuguese, Dutch, and English authorities in turn, and in addition to the issue of their mints a great variety of foreign coins have been in circulation from time to time. Perhaps the oldest in point of date are the oblong copper kahapana, of Indian origin, in imitation of which Alexander the Great when in India struck his square half-kahapana.

A series of punch-marked puranas (eldings), of doubtful date and origin and without any legend, rank next, followed by Roman oboli (pots full of which have been found in places) and a few Greek and Byzantine coins. The seaborne trade of Ceylon for the first thousand years of the

Christian era, though very extensive—Ibn Batuta, the Moor traveller, saw a hundred of the Sinhalese king's trading ships riding at anchor at one time off the Coromandel coast so late as 1344—was almost entirely one of barter; but South Indian copper coins of the seventh to the tenth centuries, with the fish device of the Pandyans, the tiger of the Cholians, or the lion of the Cheras, are frequently met with.

Sinhalese copper massas are found in astonishing profusion; these, half- and quarter-massas, with gold and silver issues of the same type, were struck by Parakkrama Bahu (A.D. 1153–1186), Wijaya Bahu (1186–1187), Nissanka Malla (1187–1196), Chodaganga Deva (1196–1197), Raja Lilavati (Queen) (1197–1200), Sahasa Malla (1200–1202), Dhamasoka Deva (1208–1209), and Bhuvanaika Bahu (1296). Of these, the rarest are the coins of Chodaganga Deva and Nissanka Malla and the lion coins of Parakkrama Bahu.

Compared with the Ceylon mintage of the Dutch towards the end of the eighteenth century, these show an astonishing degree of finish, though the conception of the human figure is of the crudest. On the obverse is shown the standing figure of the king, a conical hat on his head, a sceptre in his right hand, and a lotus in his left; two lines represent the drapery wrapped round his waist. On the reverse is the same figure seated, with the legend in the Nagara character, in which Sanskrit was usually written. This coin served as the type for several Indian issues. At the same time there were current thin flaky fanams of gold of three or four types, a somewhat similar issue in silver, the silver "fish-hook" (so called from its shape, or laryn, apparently introduced by the Arab traders with some coins of the Caliphs; all these coins were current even in the Dutch Settlements till the middle of the eighteenth century. A large copper coin has also been found and doubtfully ascribed to the Walagam Bahu dynasty. The "Setu" bull coin, said to have been issued by the Setupatis Lords of Ramnad, and hereditary guardians of "Adam's Bridge," is also, though but rarely, found.

The Portuguese had a mint at Galle, but their local coins are very rare, the most frequent being the silver "tanga" with the arms of Portugal. A lead coin issued by them was found in a gem pit fifteen feet below the surface; but the majority of their coins, including xerafims, reals, and San Thomae, were probably struck in Europe. Venetian sequins of this period are also found, and are greatly prized for the purity of their gold.

The Portuguese Settlements on the coast were occupied by the Dutch in 1646–1656; the earliest of their coins is the

Batavian copper half-stuiver of 1644. Except for an issue of thick copper stuivers, and its fractions stamped "ST" without a wreath, the early currency of the Dutch was minted in Europe. They consist of a few gold ducats, ducatoons, half-ducatoons, ten-, six-, two-, and one-stuiver pieces in silver, and duits and half-duits in copper: these last show on the obverse the monogram "V.O.C." (Vereenight Oost Indische Compagnie—United East India Company), and on the reverse the arms of the State by which they were issued, namely, Holland, Zealand, Finland, Gelderland, Utrecht, &c., from the year 1783. A series of coarsely executed two-stuiver and one-stuiver copper pieces and a few leaden duits were issued locally, the handiwork of the native smiths; the metal was greatly debased, and the currency in a state of confusion. A paper currency of six denominations, the highest being ten rix-dollars, was issued in 1796, in which year the Dutch Settlements were ceded to the British.

The first issue of the English coins, which was in silver and copper, was a slight improvement on the thick Dutch coins, and showed an elephant on the obverse and the legend "Ceylon Government" with the value on the reverse. Fresh types on the European model were issued in 1802 and 1815, both issues being struck in England: a silver fanam, ⅜ inch in diameter, was issued in 1820, and a silver rix-dollar in 1821. The present currency consists of the rupee, minted in Calcutta, and its decimal fractions minted at Birmingham for the Ceylon Government, and a paper currency of which the highest denomination is Rs. 1,000. The sovereign is also legal tender at Rs. 15.

A representative collection of Ceylon coins is exhibited by Mr. E. Booth.

The complete book on Ceylon Numismatics has not yet been written, but the collector is referred to the article by Professor Rhys Davids, sometime of the Ceylon Civil Service, in the "Numismata Orientalia," Captain Tufnell's "Hints to Coin Collectors in Southern India," Van der Chys' de Munten van der Nederlandsche Indie, Mr. Thurston's Catalogue of Coins in the Madras Museum, Colonel Lowsley's "Coins and Tokens of Ceylon" in the "Numismatic Chronicle" for 1895, and the reports of the Archæological Commissioner in Ceylon, Mr. H. C. P. Bell, C.C.S.

The Director of Public Instruction furnishes an exhaustive collection of the **Educational works** in use in the Island, issued both by the Government and private bodies, the **Lace work** made by the girls of Aided Schools, samples of the **Carpentry** turned out at the various Industrial Schools,

including the important Reformatory so successfully maintained by the Roman Catholics at Maggona, and also the **wood** and **metal work** of the Technical College. A series of photographs illustrates the system of **Education** in Ceylon, which has been already fully discussed in Chapter III.

The admirably equipped **Printing Department** of the Government, presided over by Mr. G. J. A. Skeen—whose personal aid in the production of this Handbook the Sub-Committee desire to acknowledge—is represented by a collection of some 150 or more items, selected principally from official publications, containing information on the administration, history, science, and literature of the country. The case in which they are displayed is hung with photographs of the 300 employés and views of the interior of the office. The three chief daily newspapers published in Ceylon—"The Ceylon Observer," "The Times of Ceylon," and "The Ceylon Independent," as well as the Sinhalese papers, "Sihala Samaya" and "Dinakaraprakasa," and the "Albion Press" at Galle exhibit specimens of the various works issued from their presses.

Sir Emerson Tennent, in his History of Ceylon, describes the preparation of the **Talipot leaf,** still used instead of paper in the Buddhist Temples :—

"The books of the Sinhalese are formed to-day, as they have been for ages past, of olas, or strips taken from the young leaves of the talipot or palmyra palm cut before they have acquired the dark shade and strong texture which belong to the full-grown frond. After undergoing a process (one stage of which consists in steeping them in hot water and sometimes in milk to preserve their flexibility) they are submitted to pressure to render their surface uniformly smooth. They are cut into strips of two or three inches in breadth and from one to three feet long. These are pierced with two holes, one near each end, through which a cord is passed, so as to secure them between two wooden covers, lacquered and ornamented with coloured devices. The leaves, thus strung together and secured, form a book.

On these palm leaves the custom is to write with an iron stile, held nearly upright and steadied by a nick cut to receive it in the thumb nail of the left-hand. The stile is sometimes richly ornamented, shaped like an arrow, and inlaid with gold, one blade of the feather serving as a knife to trim the leaf preparatory to writing. The case is sometimes made of carved ivory bound with hoops of filagreed silver.

The furrow made by the pressure of the stile is rendered visible by the application of charcoal ground with fragrant oil, to the odour of which the natives ascribe the remarkable state of preservation in which their most sacred books are found, its aromatic properties securing the leaves from destruction by white ants and other insects."

On these are written all the **ancient books** of the Sinhalese—the Buddhist Tripitaka was thus written in A.D. 89—which are being gradually printed and translated. There

DEVIL DANCERS. *Photo by A. W. Andrée.*

is a large exhibit of these books by the Ceylon Government, and some ancient specimens are shown by the learned priest Sri Dharmarama Terunnanse. The magnificently carved ivory and silver book covers come from the ancient and historic temples of Mukirigala, Galkene, and Kahagala, and were presented to these temples by King Kirti Sri in the middle of the eighteenth century. A handsome pair of silver covers, shown by the Ceylon Government, and several of lacquer, are available for sale.

Articles from the Maldive Islands.

The Maldive Islands are situated in the Indian Ocean due west of Ceylon, from which the nearest cluster (Ihavandiffulu atoll) is about 350 miles distant.

These islands are a dependency of the Government of Ceylon, and the reception of a yearly Embassy from the Maldive Sultan to the Government of Ceylon is a very ceremonious function, the Ambassador presenting the Sultan's letter and presents to the Governor, who makes presents in return. Almost the only other occasion on which official communications pass between the two Governments is in the case of a shipwreck on the islands, when the Sultan advises the Governor of the mishap, and His Excellency replies by thanking him for his kindness and humanity to the shipwrecked crew.

Comparatively little is as yet known about the inhabitants; the most complete work published on the subject is the Report compiled in 1883 by Mr. H. C. P. Bell, C.C.S., which treats at some length of the past history and present resources of the group.

The Maldive Islands are of coral growth, and evidently belong to the same chain of submarine mountains on which the Polyps have built up the Laccadives. They are grouped together in clusters called atolls, of which there are twenty. The atoll is formed of a number of islands of different sizes, joined by reefs which enclose a lagoon of sea water; many of the islands are themselves merely a ring of coral rock enclosing a small lagoon. The islands are covered with a thick jungle, above which tower the cocoanut trees; the vegetation is very luxuriant, but does not apparently differ from that found in Southern India and Ceylon. There are no streams on any of the islands; on most of them fresh water can be obtained from wells, but the quality differs very considerably; on some atolls it is very good, while on others it is so bad as to be dangerous.

The climate of the Maldives is similar to that of Ceylon as regards temperature; the heat is never very oppressive;

the thermometer ranges from 80° to 90° F. in the day, and is generally about 80° at night. There is always a pleasant sea-breeze, which modifies the sun's heat very much.

The Maldivians are a quiet hospitable people, though inclined to be suspicious and reserved with foreigners until they have become well acquainted with them; once their confidence is gained, however, they are extremely hospitable. They are generally intelligent-looking, and have a much more pleasant expression than the inhabitants of many other Eastern countries: frank, open faces, without a trace of sullenness. They have a decidedly Arabian caste of countenance, and are generally of a dark brown complexion, though the people of Malé, the capital, are much fairer.

The dress of the men is very simple, consisting generally of a pair of cotton drawers and a waist cloth; some wear besides a white shirt. They generally wear a coloured handkerchief round the head, but the turban is not worn. The priests and men of high caste generally wear a long sort of dress gown, reaching nearly to the ankles. The women's dress is much more elaborate and becoming; the waist cloth is of a dark brown colour with a border of black and white stripes, over which is worn a loose-fitting coloured silk shirt edged at the neck with gold or silver embroidery; round the head they twist a silk handkerchief matching the shirt in colour.

Their food consists for the most part of rice, fish, and cocoanut; the meals are eaten after the manner of Orientals, in silence, the women waiting first upon the men and afterwards taking their own meals separately.

The chief employments of the Maldivians are fishing, collecting cowries and tortoise-shell, gathering cocoanuts, cloth and mat weaving, and turning and twisting cocoanut fibre into coir yarn.

The trade of the Maldives all passes through Malé, whither the inhabitants of the other islands bring their produce, which they exchange for rice and other necessaries. The exports consist of cocoanuts, coir yarn, dried and salted fish, cowries, and tortoise-shell; the imports are mostly articles of food. The coir yarn from the Maldives is of a bright golden colour (due to the quality of the water of the lagoons in which the cotton husks are soaked) and commands a high price in the market.

The exhibits, obtained from the Colombo Museum, are the property of the Government of Ceylon.

The Hon. Mr. im Thurn and Mr. John Scott, C.C.S., show photographs taken in the Maldives.

MEEANGALA GALLERY, KADUGANNAWA INCLINE,
COLOMBO-KANDY RAILWAY.

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